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CHAPTER Env-Wq 700 STANDARDS OF DESIGN AND CONSTRUCTION FOR SEWERAGE AND WASTEWATER TREATMENT FACILITIES

Statutory Authority: RSA 485-A:6, III

REVISION NOTE:

Document #8590, effective 3-25-06, readopted with amendments and redesignated former Chapter Env-Ws 700 titled Standards of Design and Construction for Sewerage and Wastewater Treatment Facilities as Env-Wq 700 pursuant to a rules reorganization plan for Department rules approved by the Director of the Office of Legislative Services on 9-7-05.

The prior filings for former Env-Ws 700 include the following documents:

#757, eff 2-18-76
#2245, eff 12-31-82
#2670, eff 4-12-84
#4860, eff 7-5-90; EXPIRED 7-5-96
#6350, INTERIM, eff 10-5-96, EXPIRED 2-2-97
#6590, eff 9-26-97
#8434, INTERIM, eff 9-26-05, EXPIRES: 3-25-06

PART Env-Wq 701 PURPOSE AND APPLICABILITY

Env-Wq 701.01 Purpose. The purpose of this chapter is to protect public health and the environment by establishing minimum technical standards and requirements for the planning, design, and construction of sewerage and wastewater treatment facilities, including solids handling and disposal facilities.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 701.02 Applicability.

(a) Env-Wq 700 shall apply to any person that designs or constructs new sewerage, wastewater treatment, or solids handling and disposal facilities or any appurtenances related thereto.

(b) For purposes of proposed upgrades or other modifications to existing sewerage, wastewater treatment, or solids handling and disposal facilities or any appurtenances related thereto, the following provisions shall apply:

(1) Env-Wq 702 relative to definitions;

(2) Env-Wq 703 relative to engineering design documents; and

(3) All provisions of Env-Wq 704 through Env-Wq 715 that directly apply to the system(s) proposed to be upgraded or modified.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

PART Env-Wq 702 DEFINITIONS

Env-Wq 702.01 "Annual average design flow" means the entire volume of flow, including all infiltration and inflow (I/I), discharged in one year, expressed as a daily rate.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.02 "Beneficial use" means "beneficial use" as defined in Env-Ws 802.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.03 "Biochemical oxygen demand (BOD)" means the amount of oxygen used by microorganisms in the biochemical oxidation of decomposable organic matter under aerobic conditions, as expressed in milligrams per liter.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.04 "Clean Water Act" means the Federal Clean Water Act, Pub. L. 92-500 as amended by Pub. L. 95-217, Pub. L. 95-576, Pub. L. 96-483, Pub. L. 97-117, Pub. L. 100-4, 33 USC 1251 et seq.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.05 "Collector sewer" means a sewer that serves the primary purpose of collecting and transporting wastewater to the interceptor sewers.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.06 "Cross-country locations" means locations not otherwise defined as roadway locations.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.07 "Department" means the New Hampshire department of environmental services.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.08 "Discharge permit" means a national pollutant discharge elimination system (NPDES) permit or a New Hampshire groundwater discharge permit.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.09 "Engineer" means the engineer of the owner, acting individually or through duly-authorized representatives.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.10 "Gpd" means a unit of flow as measured in gallons per day.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.11 "Gpm" means a unit of flow as measured in gallons per minute.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.12 "H-20 loading" means the force imposed by a pair of 16,000 pound concentrated loads, one located over the point in question and the other located 72 inches distant, so as to simulate the tire loads of a truck.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.13 "Industrial waste" means "industrial waste" as defined by RSA 485-A:2, VI, namely "any liquid, gaseous or solid waste substance resulting from any process of industry, manufacturing trade or business or from development of any natural resources".

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.14 "Interceptor sewer" means a sewer that carries wastewater flow from collector sewers to the WWTP.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.15 "Local legislative body" means "legislative body" as defined by RSA 21:47.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.16 "Maximum daily flow" means the largest volume of flow anticipated to occur during a 24-hour period.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.17 "Maximum monthly flow" means the largest volume of flow anticipated to occur during a continuous 30-day period, expressed as a daily rate.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.18 "Minimum daily flow" means the smallest volume of flow anticipated to occur during a 24-hour period.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.19 "Minimum monthly flow" means the smallest volume of flow anticipated to occur during a continuous 30-day period, expressed as a daily rate.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.20 "Mgd" means a unit of flow as measured in million gallons per day.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.21 "Mg/l" means a unit of measurement that is milligrams per liter.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.22 "Municipality" means a city, town, district, county, or other public body created under state law and having jurisdiction over treatment and disposal of wastewater.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.23 "National Electric Code (NEC)" means the National Electric Code as adopted under RSA 155-A:1, IV and RSA 155-A:2, I.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.24 "Owner" means the municipality or private owner for which sewerage or wastewater treatment facilities are designed or constructed.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.25 "Peak instantaneous flow" means the maximum anticipated instantaneous flow expressed in gpm.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.26 "Peak hourly flow" means the largest volume of flow anticipated to occur during a one-hour period, expressed in gpm.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.27 "Person" means "person" as defined in RSA 485-A:2, IX, namely "any municipality, governmental subdivision, public or private corporation, individual, partnership, or other entity."

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.28 "Privately owned" means ownership by a person other than a municipality.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.29 "Roadway locations" means all parking lots, traveled ways, and roadway shoulders.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.30 "Sewage" means "sewage" as defined in RSA 485-A:2, X, namely, "the water-carried waste products from buildings, public or private, together with such groundwater infiltration and surface water as may be present."

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.31 "Sewer appurtenances" means components of a sewer other than pipe, such as manholes, tees, wyes, chimneys, cleanouts, and siphons.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.32 "Sewerage" means a system of pipes, pumping facilities, and appurtenances for the collection and conveyance of sewage and liquid wastes.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.33 "Standard scale" means the commonly used drafting scales of engineers and architects including, but not limited to, 1:10, 1:20, 1:40, 1:50, 1:100, and 1/8 inch, 1/4 inch, 3/8 inch, 1/2 inch, 3/4 inch and 1 inch to the foot.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.34 "Standard dimension ratio (SDR)" means the ratio of outside pipe diameter to pipe wall thickness, as used in the pipe manufacturing industry.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.35 "Total suspended solids (TSS)" means solids that either float on the surface of, or are in suspension in, water, sewage, or other liquids, and which are removable by a 0.45 micron filter.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 702.36 "Wastewater treatment plant (WWTP)" means "wastewater treatment plant" as defined by RSA 485-A:2, XVI-a, namely "the treatment facility or group of treatment devices which treats domestic or combined domestic and industrial wastewater through alteration, alone or in combination, of the physical, chemical, or bacteriological quality of the wastewater and which dewaters and handles sludge removed from the wastewater." Such facilities do not include conventional septic tank and leach field systems as regulated under RSA 485-A:29.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

PART Env-Wq 703 ENGINEERING DESIGN DOCUMENTS

Env-Wq 703.01 Submittal of Design Drawings and Technical Specifications.

(a) The owner shall submit design drawings and technical specifications for proposed new or modified publicly or privately owned sewerage and WWTPs to the department for approval in accordance with this part.

(b) The owner shall submit design drawings and technical specifications for any proposed sewer that serves more than one building or that requires a manhole at the connection, and for any proposed sewage pumping station that serves more than one building or has a capacity in excess of 50 gpm.

(c) Design drawings and technical specifications submitted to the department for review and approval shall be prepared by, or under the direct supervision of, a New Hampshire-licensed professional engineer.

(d) The owner shall submit the following number of sets of design drawings and technical specifications:

(1) For state- or federally-funded projects, 2 sets of preliminary plans and specifications for initial review and 3 sets of plans and specifications for final review; and

(2) For other projects, one set of preliminary plans and specifications for initial review and 2 sets of plans and specifications for final review.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 703.02 Technical Specifications.

(a) Complete technical specifications for the construction of sewers, sewage pumping stations, WWTPs, and appurtenances shall accompany the design drawings submitted pursuant to Env-Wq 703.01.

(b) The specifications shall describe the following information as applicable to the proposed project:

(1) All construction information not shown on the drawings that is necessary to inform the contractor of the design requirements and the quality of materials, workmanship, and fabrication of the project;

(2) The type, size, operating characteristics**,** and rating requirements of all mechanical and electrical equipment;

(3) Laboratory fixtures and equipment;

(4) Operating tools;

(5) Pipe and other construction materials;

(6) Special filter materials;

(7) Sewer appurtenances;

(8) Chemicals that will be used as part of the wastewater treatment process;

(9) Instructions for testing materials and equipment as necessary to meet design standards; and

(10) Performance tests for the completed works and component units.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 703.03 Design Drawings.

(a) All design drawings shall include the following information:

(1) A title citing the project name, location and owner;

(2) The scale;

(3) The north arrow;

(4) The name and signature of the engineer, and the imprint or stamp of his/her New Hampshire Professional Engineering license seal;

(5) The date of the original issue and all revisions;

(6) The initials of the designer, draftsperson, checker and responsible engineer;

(7) The dimensions and relative elevations of all structures;

(8) The locations and outlines of all mechanical equipment;

(9) The locations and sizes of all piping;

(10) Water levels;

(11) Existing and proposed ground elevations;

(12) A topographic map of the proposed project site; and

(13) The date and source of survey data.

(b) The design drawings shall be clear, legible, and drawn to a standard scale which permits all necessary information to be plainly shown.

(c) The design drawings shall not be larger than 24 inches by 36 inches in dimension.

(d) A vertical datum shall be indicated and, if different from the national geodetic vertical datum of the United States Geological Survey (USGS), its relationship thereto shall be noted.

(e) For any test borings:

(1) The locations of the test borings shall be shown on the plans; and

(2) Boring logs shall be included in the specifications.

(f) The design drawings shall include plan views, elevations, sections and supplementary views which, together with the specifications and general layouts, provide the working information for the contract and construction of the works.

(g) The following information shall be submitted by the engineer:

(1) A location plan showing the location of all parts of the project with respect to municipal boundaries and the location and extent of the tributary area within the project area;

(2) Detail plan and profile sheets of all proposed sewers and force mains;

(3) Details of construction of manholes, siphons, and other sewer appurtenances;

(4) General and detail plans for WWTPs and sewage pumping stations; and

(5) Technical specifications for all proposed construction.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 703.04 Design Drawings for Sewers. Design drawings for proposed sewers shall, in addition to meeting the applicable requirements of Env-Wq 703.01 through Env-Wq 703.03, include the following:

(a) Contour lines at 2-foot intervals and elevation of existing and proposed project area;

(b) The locations of all streams and other surface waters, including their direction of flow and water surface elevations at the time of survey;

(c) 100-year flood elevations, if available;

(d) The boundary lines of the municipality, sewer district, or other area to be sewered;

(e) The location, size, and direction of flow of all existing and proposed sewers;

(f) Insets and detail sections with the scale shown directly beneath their subtitles;

(g) Plan and profile views in which the plan view is placed at the top;

(h) Plans clearly showing the location of:

(1) All existing structures affecting the project;

(2) Existing and proposed sewer outlets or overflows; and

(3) All other utilities in the vicinity of the proposed sewers;

(i) The locations of existing, proposed, and future sewers as differentiated by appropriate symbols or designations;

(j) All topographical symbols and conventions as employed by the USGS;

(k) The horizontal distance or stationing between manholes, grades in feet per foot, and sewer sizes, types, and class;

(l) All sewer appurtenances depicted by symbols and referenced by a legend, with detail drawings of all sewer appurtenances accompanying the detail sewer plans;

(m) Profiles indicating:

(1) All manholes with manhole identification numbers;

(2) Existing and proposed water main crossings with elevations;

(3) Siphons;

(4) Sewage pumping stations; and

(5) In the case of stream crossings, the elevations of stream beds, normal flow lines, and the type of pipe.

(n) The sizes and gradients of sewers, surface elevations, first floor house elevations, and sewer inverts shown at or between each manhole;

(o) Profiles including borings and groundwater level and, except for special details, drawn to standard scales, indicated on each sheet;

(p) Finish grade elevations;

(q) Elevations of manhole inverts shown to the nearest 0.01 foot;

(r) All elevations referenced to a standard datum that is indicated on the plans; and

(s) As specified by the engineer, any special precautions or methods of construction necessary to prevent surface water pollution.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 703.05 Design Drawings for Sewage Pumping Stations. Design drawings for proposed sewage pumping stations shall, in addition to meeting the applicable requirements of Env-Wq 703.01 through Env-Wq 703.04, include the following:

(a) Existing sewage pumping station locations and elevations;

(b) The location(s) and elevation(s) of all proposed sewage pumping station(s), including provisions for installation of future pump(s) if required to meet full build-out of the service area.

(c) Elevation of high water at the site and maximum elevation of sewage in the collection system; and

(d) Test boring logs and groundwater elevations.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 703.06 WWTP Plans. Design drawings for proposed WWTPs or modifications to existing WWTPs shall, in addition to meeting the applicable requirements of Env-Wq 703.01 through Env-Wq 703.05, include the following:

(a) A location plan that shows the WWTP in relation to the sewer system, including topographic features to indicate its location in relation to streams and the point of effluent discharge; and

(b) Layouts of the proposed WWTP or proposed modifications to an existing WWTP that include the following:

(1) Topography of the site using 2-foot contours;

(2) Dimensions, elevations, and location of all existing and proposed WWTP structures;

(3) Site boundaries including areas reserved for future expansion and all buildings or building lots within 600 feet of WWTP property;

(4) A process and instrumentation diagram showing the flow of sewage, sidestream flows, and sludge through the WWTP units;

(5) Piping, including any arrangements for bypassing individual units and the materials handled and direction of flow through pipes;

(6) Hydraulic profiles showing the annual average, maximum day, and peak instantaneous flow elevations;

(7) The high and low water level elevations of the water body to which the WWTP effluent discharges or is proposed to discharge, including the 25-year and 100-year flood levels;

(8) A summary of WWTP and unit process design criteria, capacity, and sizing; and

(9) A description of any features not otherwise covered by the technical specifications or reports.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 703.07 Sewer Connection Permit.

(a) Any person proposing to construct or modify any of the following shall submit an application for a sewer connection permit to the department:

(1) Any extension of a collector or interceptor, whether public or private, regardless of flow;

(2) Any wastewater connection or other discharge in excess of 5,000 gpd;

(3) Any wastewater connection or other discharge to a WWTP operating in excess of 80 percent design flow capacity based on actual average flow for 3 consecutive months;

(4) Any industrial wastewater connection or change in existing discharge of industrial wastewater, regardless of quality or quantity; and

(5) Any sewage pumping station greater than 50 gpm or serving more than one building.

(b) The applicant shall provide the following on a sewer connection permit request form available from the department:

(1) The name of the municipality;

(2) The length, size**,** and location of the extension, if applicable, and the connection to the existing collection system;

(3) The quantity or flow rate of the proposed wastewater discharge;

(4) A request for department authorization to add the proposed wastewater discharge to the municipal sewage collection, treatment, and disposal system;

(5) A statement as to whether the receiving sewers and WWTP suffer from hydraulic surcharging or overloads;

(6) A statement as to whether the proposed sewer connection meets with the approval of the appropriate local authorities;

(7) The signature and title of the municipal official who is authorized to sign on behalf of the municipality; and

(8) Such additional information as may be required under Env-Ws 904 for industrial wastewater discharges.

(c) The applicant shall remit the permit review fee or design review fee in the amount specified in RSA 485-A:4 with the sewer connection permit application and applicable engineering plans.

(d) The department shall issue a sewer connection permit only if the receiving WWTP is, or will be, capable of adequately processing the added hydraulic flow and organic load at the time of connection.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 703.08 Project Revision and Approval Requirements.

(a) For projects that receive any state or federal funds, the owner shall obtain written approval of the design plans and specifications from the department prior to bidding the project.

(b) For all other projects, the owner shall:

(1) Submit the design plans and specifications at least 30 days prior to the anticipated start of construction, as per RSA 485-A:4, VI; and

(2) Obtain written approval of such plans and specifications prior to commencing construction, as per RSA 485-A:4, IX.

(c) No deviations from approved plans or specifications shall be made without prior written approval from the department in accordance with this chapter. All deviations from the original approved plans or specifications shall be reflected in the record drawings.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 703.09 Contract and Bidding Requirements. Owners of projects that may receive state or federal funds for construction projects shall:

(a) Use the contract documents approved by the U.S. Department of Agriculture, Rural Development Office, for use in New Hampshire; and

(b) Following the bidding requirements set forth below:

(1) The bid period shall be of a duration of not less than 30 calendar days;

(2) The advertisement for bids shall include the following information:

a. The project name and contract number;

b. The location of work;

c. A description of work to be performed;

e. The names and addresses of persons receiving bids;

f. The time and date at which the bids will be publicly opened and read aloud, and a statement that bids received after that time will not be accepted;

g. An address and cost information for obtaining plans and specifications with refund details for returned plans; and

h. The addresses where plans and specifications can be examined;

(3) The bidder shall include with the bid a bid security in the amount of 10% of the bid in the form of a certified check or a bid bond executed by a surety company authorized to do business in New Hampshire and made payable to the owner;

(4) The successful bidder shall furnish a 100% performance bond and a 100% payment bond;

(5) The owner shall require the successful bidder to execute the contract agreement within 10 days following notification of the acceptance of the bid; and

(6) The owner shall reserve the right to:

a. Reject any or all bids;

b. Accept any bid;

c. Waive any informality on bids received; and

d. Omit any bid item.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

PART Env-Wq 704 DESIGN OF SEWERS

Env-Wq 704.01 Type of Sewers.

(a) All new sewerage systems or extensions shall be designed as separated sanitary and storm systems.

(b) Rain water from roofs, streets, and other paved areas, and groundwater from foundation drains and sump pumps shall be excluded from the sanitary sewer.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 704.02 Design Period. Sewer systems shall be designed based on full build-out.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 704.03 Design Flow Basis.

(a) For facilities that are operating as of the effective date of the 2006 readoption of this chapter, sanitary waste flows from residentially-, commercially-, or industrially-zoned areas shall be measured.

(b) For proposed facilities, sanitary waste flows shall be estimated on the basis of the following:

(1) For commercial areas or industrial parks, as specified in Tables 3-2, 3-3, and 3-4 of Metcalf and Eddy, “Wastewater Engineering Treatment Disposal Reuse”, 4th edition; and

(2) For residential areas, an average daily per capita flow of not less than 70 gpd.

(c) New sewers shall be designed to carry the peak hourly flow rate at full pipe capacity, calculated as the product of the average daily flow rate for the service area multiplied by a peaking factor, plus an infiltration allowance.

(d) Peaking factors for average daily flow rates in excess of 100,000 gpd shall be as derived from Figure 2.1 of TR-16 Guides for the Design of Wastewater Treatment Works, New England Interstate Water Pollution Control Commission, 1998 Edition. A peaking factor of 6 shall be used for average daily flows less than 100,000 gpd.

(e) Design of interceptor sewers shall be based on the greater of the total contributory flow from the collection system served or 2.5 times the average flow of the tributary system.

(f) Infiltration allowance for the design of sewers shall be as follows:

(1) For areas to be sewered in the future, an infiltration allowance of 150 gpd per acre shall be used;

(2) For sewers under design, an allowance of 300 gallons per inch diameter per mile per day shall be made; or

(3) For sewers in use as of the effective date of the 2006 readoption of this chapter to be intercepted by the sewer or interceptor under design, infiltration shall be measured during high spring groundwater conditions.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 704.04 Details of Design and Construction.

(a) No gravity sewer shall be smaller than 8 inches in nominal diameter.

(b) Sewers shall be buried to a minimum depth of 6 feet below grade in all roadway locations, and to a minimum depth of 4 feet below grade in all cross-country locations.

(c) Sewers shall be designed and constructed at such slopes as to prevent deposition of organic solids, with a minimum flow velocity for design purposes of 2 feet per second when flowing full.

(d) The minimum allowable slope shall be as set forth in Table 704-1 below.

Table 704-1 Minimum Pipe Slope

Nominal Pipe Diameter (Inches)	Minimum Slope (feet/foot)
8	0.0040
10	0.0028
12	0.0022
14	0.0017
15	0.0015
16	0.0014
18	0.0012
21	0.0010
24	0.0008
27	0.0007

30	0.0006
36	0.0005

(e) Sewers smaller than 48 inches in nominal diameter shall be laid with straight alignment between manholes.

(f) When a smaller sewer joins a larger one, the invert of the larger sewer shall be lowered sufficiently to maintain the same hydraulic gradient. An approximate method which may be used for securing these results is to place the 0.8 depth point of both sewers at the same elevation.

(g) A reduction in the size of the outgoing sewer from a manhole shall be allowed only on sewers larger than 24-inch diameter and only if the capacity of the outgoing sewer is not exceeded.

(h) Where velocities greater than 10 feet per second are attained, provisions shall be made to protect against displacement by erosion and shock.

(i) Sewers crossing streams or located within 10 feet of a stream embankment shall be protected against erosion.

(j) Force mains shall be designed to withstand hydrostatic pressures of at least 2.5 times the design total dynamic head.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 704.05 Gravity Sewer Construction Materials. The technical specifications shall specify the approved gravity sewer pipe and materials to be used on the project, as follows:

(a) Ductile iron pipe and fittings shall conform to the following standards of the American Water Works Association (AWWA):

(1) AWWA C151/A21.51-02 for ductile iron pipe, centrifugally cast in metal- or sand-lined molds, for water or other liquids;

(2) AWWA C150/A21.50-02 for thickness design of ductile iron pipe and with ASTM A536-84 (2004) ductile iron castings; and

(3) Joints shall be mechanical type, push-on type, or ball-and-socket type;

(b) Plastic gravity sewer pipe and fittings shall comply with the standards listed in Table 704-2 below:

TABLE 704-2 Plastic Pipe

ASTM Standard	**Generic Pipe Material**	**Sizes Approved**
D3034-04a	Polyvinyl chloride (PVC), solid wall	8-inch through 15-inch (SDR 35)
F679-03	PVC, solid wall	18-inch through 27-inch (T-1 & T-2)
F794-03	PVC, ribbed wall	18-inch through 36-inch
F1760-01(2005)e1	PVC, recycled	All diameters

(c) Plastic sewer pipe shall have a pipe stiffness rating of at least 46 pounds per square inch at 5 percent pipe diameter deflection, as measured in accordance with ASTM D2412-02 during manufacture;

(d) Joint seals for PVC pipe shall be oil resistant compression rings of elastomeric material conforming to ASTM D3212-96(a)(2003)e1 and shall be push-on, bell-and-spigot type;

(e) Concrete pipe shall conform to AWWA C302-04;

(f) Prestressed concrete cylinder pipe and fittings shall conform to AWWA C301-99; and

(g) Joints for concrete cylinder pipe shall be made of oil resistant elastomeric material conforming to AWWA C301-99 specification.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 704.06 Force Main and Low Pressure Sewer Construction Materials.

(a) Force mains and low pressure sewers shall be constructed of ductile iron (DI), high density polyethylene (HDPE), or PVC material.

(b) Force mains and low pressure sewers shall be treated as gravity sewers for purposes of foundation bedding and backfill requirements.

(c) PVC pipe used for force mains and low pressure sewers shall conform to ASTM D2241-05 or ASTM D1785-05.

(d) HDPE pipe used for force mains and low pressure sewers shall conform to ASTM D3035-03a.

(e) All DI pipe shall be corrosion protected if installed in a corrosive environment that could reduce the typical life expectancy of the pipe.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 704.07 Gravity Sewer Pipe Testing.

(a) All new gravity sewers shall be tested for water tightness by the use of low-pressure air tests.

(b) Low-pressure air testing shall be in conformance with:

(1) ASTM F1417-92(2005) “Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air”; or

(2) Uni-Bell PVC Pipe Association Uni-B-6, “Low-Pressure Air Testing of Installed Sewer Pipe” (1998).

(c) All new gravity sewers shall be cleaned and visually inspected and shall be true to line and grade following installation and prior to use.

(d) All plastic sewer pipe shall be deflection tested not less than 30 days following installation.

(e) The maximum allowable deflection of flexible sewer pipe shall be 7 ½ percent of average inside diameter.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 704.08 Force Main and Low Pressure Sewer Testing. Force mains and low pressure sewers shall be tested in accordance with section 4 of AWWA C600-05 “Installation of Cast Iron Water Mains and Their Appurtenances”, at a pressure equal to the greater of 150 percent of the design operating total dynamic head or at least 100 psi.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 704.09 Trench Construction.

(a) Trench dimensions shall be as follows:

(1) For sewer pipe less than 15 inches in diameter, the allowable trench width at a plane 12 inches above the pipe shall be no more than 36 inches; and

(2) For pipe 15 inches and larger, the allowable trench width shall be equal to the pipe outside diameter plus 24 inches.

(b) Pipe trench bedding material and fill material for excavation below grade shall be screened gravel or crushed stone to ASTM C33-03 stone size No. 67.

(c) Subject to (d), below, the pipe sand blanket material shall be graded sand free from organic materials, graded such that 100 percent passes a ½-inch sieve and a maximum of 15 percent passes a #200 sieve.

(d) In lieu of the sand blanket specified in (c), above, a stone envelope 6 inches thick completely around the pipe using ¾-inch stone may be used.

(e) Pipe bedding material shall extend from a horizontal plane through the pipe axis to 6 inches below the bottom of the outside surface of the pipe.

(f) Pipe sand blanket material shall cover the pipe a minimum of 12 inches above the crown of the outside surface.

(g) Compaction shall be in 12-inch layers for bedding and blanket materials.

(h) Backfill material shall be compacted in 3-foot layers to the ground surface except for road construction where the final 3 feet shall be compacted in 12-inch layers to the road base surface.

(i) Trench backfill material in roadway locations shall be natural materials excavated from the trench during construction, excluding:

(1) Debris;

(2) Pieces of pavement;

(3) Organic matter;

(4) Top soil;

(5) Wet or soft muck;

(6) Peat or clay;

(7) Excavated ledge material;

(8) Rocks over 6 inches in the largest dimension; and

(9) Any material not approved by the engineer.

(j) Trench backfill at cross-country locations shall be as described in (i) above, except that top soil, loam, muck or peat may be used provided the completed construction will be stable, and provided that access to the sewer for maintenance and reconstruction is preserved.

(k) Backfill shall be mounded 6 inches above original ground at cross country locations.

(l) Base course for trench repair shall meet the requirements of Division 300 of the "Standard Specifications for Road and Bridge Construction" of the New Hampshire department of transportation as available at http://www.nh.gov/dot/bureaus/highwaydesign/specifications/index.htm.

(m) Where sheeting is placed alongside the pipe and extends below mid-diameter, the sheeting shall be cut off and left in place to an elevation not less than one foot above the top of the pipe and at least 3 feet below finished grade.

(n) Trenches for sewer pipes with slopes over 0.08 feet per foot and trenches for sewer pipes below seasonal high ground water level shall have impervious trench dams constructed every 300 feet to prevent potential disturbance to pipe bedding and blanket materials.

(o) Precautions shall be taken to avoid groundwater pooling at the surface by providing drainage to a suitable outlet at catch basins or run-off swales.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 704.10 Manholes.

(a) All component parts of manhole structures shall have the strength, leak resistance, and space necessary for the intended service.

(b) Manhole structures shall have a life expectancy in excess of 25 years.

(c) Manhole structures shall be designed to withstand H-20 loading and shall not leak in excess of one gpd per vertical foot of manhole for the life of the structure.

(d) Barrels and cone sections shall be constructed of precast reinforced concrete.

(e) Base sections shall be of monolithic construction to a point at least 6 inches above the crown of the incoming pipe.

(f) Horizontal joints between sections of precast concrete barrels shall be of an overlapping type, sealed for water-tightness using a double row of an elastomeric or mastic-like sealant.

(g) Pipe to manhole joints shall be as follows:

(1) Elastomeric, rubber sleeve with watertight joints at the manhole opening and pipe surfaces;

(2) Cast into the wall or secured with stainless steel clamps;

(3) Elastomeric sealing ring cast in the manhole opening with seal formed on the surface of the pipe by compression of the ring; and

(4) Non-shrink grouted joints where watertight bonding to the manhole and pipe can be obtained.

(h) Manhole cone sections shall be eccentric in shape.

(i) All precast sections and bases shall have the date of manufacture and the name or trademark of the manufacturer impressed or indelibly marked on the inside wall.

(j) Manholes shall have a brick paved shelf and invert constructed to conform to the size of pipe and flow. At changes in direction, the inverts shall be laid out in curves of the longest radius possible tangent to the center line of the sewer pipes. Shelves shall be constructed to the elevation of the highest pipe crown and sloped to drain toward the flowing through channel. Underlayment of invert and shelf shall consist of brick masonry. Inverts and shelves shall be placed after testing.

(k) Materials of construction for manholes shall be as follows:

(1) Concrete for cast-in-place bases or complete manholes shall conform to the requirements for class AA concrete in the New Hampshire department of transportation's "Standard Specifications for Road and Bridge Construction" as available at http://www.nh.gov/dot/bureaus/highwaydesign/specifications/index.htm;

(2) Reinforcing for cast-in-place concrete shall be steel or structural fibers that conform to the requirements of the New Hampshire department of transportation's "Standard Specifications for Road and Bridge Construction" as available at http://www.nh.gov/dot/bureaus/highwaydesign/specifications/index.htm;

(3) Precast concrete barrel sections, cones, and bases shall conform to ASTM C478-06;

(4) The manhole frame and cover shall provide a 30-inch diameter clear opening;

(5) The manhole cover shall have the word "SEWER" in 3-inch letters cast into the top surface;

(6) The castings shall be of even-grained cast iron, smooth**,** and free from scale, lumps, blisters, sand holes**,** and defects;

(7) Contact surfaces of covers and frames shall be machined at the foundry to prevent rocking of covers in any orientation;

(8) Castings shall be equal to class 30, conforming to ASTM A48/48M-03;

(9) Brick masonry for shelf, invert and grade adjustment shall comply with ASTM C32-05, clay or shale, for grade SS hard brick;

(10) Mortar shall be composed of portland cement and sand with or without hydrated lime addition;

(11) Proportions in mortar of parts by volumes shall be:

a. 4.5 parts sand and 1.5 parts cement; or

b. 4.5 parts sand, one part cement and 0.5 part hydrated lime;

(12) Cement shall be type II portland cement conforming to ASTM C150-05;

(13) Hydrated lime shall be type S conforming to the ASTM C207-06 "Standard Specifications for Hydrated Lime for Masonry Purposes";

(14) Sand shall consist of inert natural sand conforming to the ASTM C33-03 "Standard Specifications for Concrete, Fine Aggregates";

(15) Concrete for drop supports shall conform to the requirement for class AAA concrete of the New Hampshire department of transportation's "Standard Specifications for Road and Bridge Construction" as available at http://www.nh.gov/dot/bureaus/highwaydesign/specifications/index.htm;

(16) Subject to (17), below, a flexible pipe joint shall be provided within the following distances from any manhole connection:

a. Within 48 inches for reinforced concrete (RC) pipe; and

b. Within 60 inches for PVC pipe larger than 15-inch diameter;

(17) No flexible joint shall be required for:

a. DI pipe; or

b. PVC pipe up through 15-inch diameter; and

(18) When manhole depth is less than 6 feet, a reinforced concrete slab cover may be used in lieu of a cone section, provided the slab has an eccentric entrance opening and be capable of supporting H-20 loads.

(l) Manhole steps shall:

(1) Be permitted only at the request of the system owner;

(2) Be manufactured of stainless steel, plastic-covered steel, or plastic;

(3) Be shaped so that they cannot be pulled out of the concrete wall into which they are secured;

(4) Meet the requirements of ASTM C478-06 for load carrying capacity and pull-out resistance;

(5) Not be secured with mortar;

(6) Be approximately 14 inches by 10 inches in dimension;

(7) Have a drop section or raised abutments to prevent sideways slippage off the step; and

(8) Have non-skid safety serrations on the foot contact surfaces.

(m) Manholes shall be installed at the end of each sewer line, at all intersections, and at all changes in grade, size or alignment. In establishing a maximum space between manholes, the engineer shall not exceed the distance that can be cleaned by the cleaning equipment the owner already has on hand or proposes to obtain. In no case shall the distance between manholes be greater than 500 feet for sewers up to and including 48 inches in diameter, nor greater than 1,000 feet for sewers larger than 48 inches in diameter.

(n) The minimum internal diameter of manholes shall be 48 inches. For sewers larger than 24-inch diameter, manhole diameters shall be increased so as to provide at least 12 inches of shelf on each side of the sewer.

(o) The invert of the incoming pipe shall be no more than 6 inches above the invert of the outgoing pipe unless a drop entry pipe is used.

(p) Sewer slopes shall be adjusted to avoid differences in incoming and outgoing pipe inverts greater than 6 inches unless a drop entry pipe is used.

(q) A drop entry pipe shall be provided for any sewer entering a manhole at an elevation of 24 inches or more above the manhole invert. The drop pipe may be constructed internal or external to the manhole.

(r) The maximum size limits and number of internal drop pipes within a manhole shall be as follows:

(1) For 4-foot, 0-inch diameter manholes, one 10-inch internal drop pipe; and

(2) For 5-foot, 0-inch diameter manholes, one 15-inch or two 10-inch diameter drop pipes.

(s) In the flow channel, a drop of at least 0.1 feet shall be provided between incoming and outgoing sewers on all manholes.

(t) Slope across manholes shall be the average slope of the incoming and outgoing sewers. Design shall include measures to prevent or eliminate hydraulic jumps across the manholes.

(u) Watertight manhole covers shall be used for all manholes located in flood-prone areas as determined by the municipality.

(v) Electrical equipment installed or used in manholes shall conform to the requirements of the National Electric Code (NEC) for installation in areas classified by the NEC as Class 1, Division 1.

(w) Precast bases shall be placed on a 6-inch layer of compacted bedding material that conforms to ASTM C33-03 No. 67 stone. The excavation shall be properly dewatered while placing bedding material and setting the base or pouring concrete. Water-stops shall be used at the horizontal joint of cast-in-place manholes.

(x) Manholes shall be tested for leakage using a vacuum test.

(y) The manhole vacuum test shall conform to the following:

(1) The initial vacuum gauge test pressure shall be 10 inches Hg; and

(2) The minimum acceptable test hold time for a 1-inch Hg pressure drop to 9 inches Hg shall be:

a. Not less than 2 minutes for manholes less than 10 feet deep in depth;

b. Not less than 2.5 minutes for manholes 10 to 15 feet deep; and

c. Not less than 3 minutes for manholes more than 15 feet deep;

(z) The manhole shall be repaired and retested if the test hold times fail to achieve the acceptance limits specified in (y) above.

(aa) Following completion of the leakage test, the frame and cover shall be placed on the top of the manhole or some other means used to prevent accidental entry by unauthorized persons, children, or animals, until the contractor is ready to make final adjustment to grade.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 704.11 Inverted Siphons. Inverted siphons shall have not less than 2 barrels with a minimum pipe size of 6 inches. Maintenance manholes and appurtenances shall be provided at both ends of the siphon to facilitate convenient flushing and maintenance of the siphons. Pipe sizes and a hydraulic head shall be

selected to secure velocities of at least 3.0 feet per second for average design flows in each siphon. The inlet and outlet details shall be arranged so that flow can be diverted to one barrel, so that either barrel may be taken out of service.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 704.12 Protection of Water Supplies.

(a) There shall be no physical connection between a public or private potable water supply system and a sewer or sewer appurtenance which would permit the passage of sewage or polluted water into the potable supply. No water pipe shall pass through or come in contact with any part of a sewer or sewer manhole.

(b) No sewer shall be located within the well protective radii established in Env-Ws 300 for any public water supply well~~s~~ or within 100 feet of any private water supply well.

(c) Sewers shall be located at least 10 feet horizontally from any existing or proposed water main.

(d) A deviation from the separation requirements of (b) or (c) above shall be allowed where necessary to avoid conflict with subsurface structures, utility chambers, and building foundations, provided that the sewer is constructed in accordance with the force main construction requirements specified in Env-Wq 704.06.

(e) Whenever sewers must cross water mains, the sewer shall be constructed as follows:

(1) Vertical separation of the sewer and water main shall be not less than 18 inches, with water above sewer; and

(2) Sewer pipe joints shall be located at least 6 feet horizontally from the water main.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 704.13 Service Connections.

(a) Service connections shall use sanitary tee or wye fittings for all new sewer construction.

(b) The centerline of all building connections shall enter the top half of the sewer.

(c) Any service connection~~s~~ with a vertical rise up to 4 feet may have the sewer fitting set vertically.

(d) Any service connection~~s~~ with a vertical rise greater than 4 feet shall be provided with added support by encasing the fitting and riser in a precast concrete chimney.

(e) As an alternate to (d), above, any service connections with a vertical rise up to 12 feet may employ non-encased risers which protect against pipe penetration or failure at the fitting by the use of bell on bell connections.

(f) For existing sewers where fittings cannot be installed, saddle connections shall be used.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

PART Env-Wq 705 SEWAGE PUMPING STATIONS

Env-Wq 705.01 Sewage Pumping Station Design Requirements.

(a) Sewage pumping stations shall be designed for uninterrupted operation under flood conditions of a 25-year frequency, and shall be protected against damage from 100-year floods. The sewage pumping station shall be readily accessible.

(b) The wet well and the discharge manifold shall be configured to prevent grit from settling back into pump discharge lines of pumps that are not operating.

(c) The following types of sewage pumping stations shall be allowed:

(1) Dry well/wet well type design with pumps and drives located in a separate dry chamber with flooded suctions;

(2) Suction lift type with pumps and drives in a separate dry chamber; and

(3) Submersible type with pumps submerged.

(d) Sewage pumping stations shall meet the following requirements:

(1) Wet and dry wells including their superstructure shall be completely separated and sealed;

(2) Dry wells shall provide accessibility for the repair and removal of pumps, motors, and other items of equipment that are essential to the sewage pumping process;

(3) Separate exterior entrances shall be provided to both wet wells and dry wells of sewage pumping stations;

(4) For built-in-place sewage pumping stations, access to lower levels shall be by stairways with handrails;

(5) Prefabricated stations may have ladders with less than or equal to a 75 degree slope or spiral stairs;

(6) Vertical distances between floors or rest landings shall not exceed 12 feet;

(7) Safety barriers to prevent falling shall be provided at landings;

(8) Power elevators proposed for all deep stations shall have a capacity limit of not less than 600 pounds;

(9) A minimum of 2 pumps, each designed to handle peak hourly flows, shall be provided;

(10) Where 3 or more pumps are provided, they shall be designed such that, with any one unit out of service, the remaining units shall have the capacity to handle peak hourly sewage flows;

(11) All pumps shall be protected from damage due to large solid objects;

(12) Pumps shall be capable of passing 3-inch solids, or 2.5-inch solids if preceded by a grinder unit;

(13) Submersible pumps shall be capable of removal without disconnecting pipes or dewatering and reseating using non-corroding guide rails or cables;

(14) Lifting equipment shall be provided for submersible pump removal;

(15) Lifting chains shall be stainless steel or other corrosion resistant material;

(16) Self-priming suction lift pump systems shall be designed such that:

a. The system's reprime capacity is greater than the static suction head; and

b. The system's available net positive suction head is greater than the required net positive suction head;

(17) The use of a vacuum pump for priming of suction lift stations as an alternate to self priming shall be limited to stations of 100 gpm or less peak capacity;

(18) Suitable devices for measuring and recording wastewater flow shall be provided at all sewage pumping stations, as follows:

a. Sewage pumping stations with capacities of more than 500 gpm shall have continuous recording and a totalizer; and

b. Sewage pumping stations with capacities of 500 gpm or less shall have:

1. A running meter that indicates the total running time of the pumps; or

2. The continuous recording and totalizer as per a., above;

(19) Where potable water is used for pump sealing purposes, the potable water supply shall be protected by a break tank or reduced pressure zone back flow preventer;

(20) Wet well design shall avoid vortexing and air entrainment near the pump suction intakes;

(21) A separate sump pump shall be provided in the dry well to remove leakage or drainage, with the discharge above the alarm level of the wet well;

(22) Water ejectors connected to a potable water supply shall be prohibited;

(23) All floor and walkway surfaces shall slope to a point of discharge;

(24) Pumps shall be protected by check valves from being driven in the reverse direction;

(25) Pump controls shall provide autostart of lag pump should lead pump fail to start;

(26) Flooded suction pumping systems shall be designed such that:

a. Shut-off valves are provided in the suction piping;

b. Shut-off valves and check valves are provided in the discharge piping; and

c. Discharge shut-off valves are located downstream of the check valve;

(27) Shut-off and check valves for submersible pumps shall be placed in a separate chamber for ease of maintenance;

(28) Wet wells for sewage pumping stations of greater than 200 gpm capacity shall have division walls so that the station can be kept in operation when work is required in the wet well;

(29) The effective capacity of the wet well shall be based on the cycle time of the pumps for constant speed operation so as to prevent short cycling of the pumps;

(30) The wet well floor shall have a minimum slope of 1 to 1 to the hopper bottom; and

(31) The horizontal area of the hopper bottom shall be limited to that area required for proper installation and function of the inlet.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 705.02 Sewage Pumping Station Electrical Requirements.

(a) Submersible pumps for sewage pumping stations shall:

(1) Conform to NEC requirements for installation in areas classified by the NEC as class I, division 1; or

(2) Be rated for class I, division 2 requirements when mechanical forced air ventilation is provided.

(b) Electric motors shall be protected from flooding.

(c) Electrical systems and components including motors, lights, cable, conduits, switch boxes and control circuits in enclosed or partially enclosed spaces where flammable mixtures occasionally may be present, including raw sewage wet wells, shall comply with the NEC requirements for class I, division 1 locations.

(d) All electrical equipment and work shall comply with the requirements of:

(1) The NEC; and

(2) The National Fire Protection Association (NFPA) 820 (2003) Standard for Fire Protection in Wastewater Treatment and Collection Facilities.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 705.03 Sewage Pumping Station Ventilation Requirements.

(a) Ventilation for personnel and equipment shall be provided for all sewage pumping stations.

(b) Where the pump pit is below the ground surface, mechanical ventilation shall be provided, so arranged as to independently ventilate the dry well and the wet well.

(c) There shall be no interconnection between the wet well and dry well ventilation systems.

(d) Switches for operation of ventilation equipment shall be marked and located conveniently.

(e) Dehumidification shall be provided in below-ground pump chambers.

(f) Ventilation of wet wells shall provide at least 30 air changes per hour if the ventilation system is operated intermittently, or at least 12 air changes per hour if the ventilation system is operated continuously.

(g) Fans installed within the wet well structure shall be made of non-spark material.

(h) Ventilation of submersible pump chambers or suction lift wet wells where there is no occupancy for regular maintenance purposes may be by gravity ventilation.

(i) Ventilation exhaust from wet wells shall not cause an odor nuisance to the public or surrounding occupied buildings.

(j) Access doors to wet wells shall have warning signs on the underside which read, “Warning - Hazardous Area, enter only with proper equipment” or “Confined Space, Entry by Permit Only”, as appropriate.

(k) The ventilation system of the dry well shall be capable of continuously providing at least 6 air changes per hour when the facility is occupied, and at least 3 air changes per hour when not occupied.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 705.04 Alarm Systems.

(a) Alarm systems shall be provided for all sewage pumping stations.

(b) The alarm signal shall be activated in any one of the following cases:

(1) High water in the wet well;

(2) Low water in wet well;

(3) Loss of one or more phases of power supply or severe voltage drop;

(4) High water level in the pump room sump;

(5) Loss of the alarm transmission line; or

(6) Standby generator application, if applicable.

(c) The high water alarm trigger shall be a separate device, independent of the pump wet well level control system.

(d) Satisfactory operation of the alarm system shall be indicated on a panel with a light which lights up upon failure of the alarm system.

(e) The power source for the alarm system shall be:

(1) An independent battery with continuous charge; or

(2) Main line power with a back-up battery system, which shall be connected automatically should main power fail.

(f) The alarm signal shall be transmitted through a 24 hour per day, 7 day per week notification system to the appropriate utility operator.

(g) The alarm shall include a local audible enunciator and a light.

(h) Provision shall be made to permit silencing of the audible enunciator manually, after the alarm has been sounded, but the light shall continue until the alarm condition has been rectified.

(i) Alarm signals for privately-operated sewage pumping stations shall be transmitted to the responsible maintenance person directly or via an answering service.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 705.05 Instruction and Equipment. The owner shall obtain and provide a complete set of operational instructions, including recommendation for spares and maintenance, at each sewage pumping station so as to be available to all operators.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 705.06 Emergency Operation.

(a) The engineer shall recommend emergency operation procedures to prevent the back-up, overflow, or other unpermitted discharge of wastewater from the sewage pumping station.

(b) An independent engine-generator type source of electric power shall be provided for electrically-driven pumps. This source shall be automatically activated by failure of any phase of power supply or upon any fluctuation in voltage, the amount or duration of which would cause damage to the motors. Installations shall comply with all applicable requirements of the NEC and the state fire code.

(c) The emergency power generator shall be permanently secured in place, with provisions for removal to facilitate generator repair or replacement.

(d) Provisions shall be made for automatic and manual start-up and cut-in. The controls shall be such that upon automatic start-up under emergency conditions, shut-down shall be accomplished automatically on restoration of utility power with controlled shut-down of unit. Manual shut down shall also be provided. Provision shall be made to allow pumps to run down before re-energizing on transfer of power.

(e) The emergency power generator shall be sized to sequentially start and operate all pumps needed to handle design maximum waste flows, plus lighting, ventilation, controls, and grinding or screening.

(f) The emergency power generator shall be located above grade with ventilation of exhaust gases.

(g) All emergency power generation equipment shall be provided with instructions for routine exercising, load testing, and maintenance.

(h) The generator engine controls shall be equipped with an automatic exerciser which can be set on any selected schedule to start the generator, run the generator under no-load or load conditions by selection, and shut the generator off without actuating the alarm system.

(i) Alternatives to a generation set may be provided in the following circumstances:

(1) Sewage pumping stations with capacities of 100 gpm or less may use wet well storage over and above normal operating system storage provided that:

a. The additional wet well storage shall provide at least 6 hours of flow detention at average daily flow;

b. A suitable receptacle shall be included in the electrical supply panel for connection to a portable generator with manual transfer; and

c. A suitable receptacle shall be included in the electrical supply panel for connection to a portable pump with manual transfer; and

(2) For sewage pumping stations with duplex pumps located above grade where duration of power loss will not present freezing problems, a standby engine drive system which automatically

starts on power loss to drive one pump may be furnished as an alternative to a permanent generator.

(j) No sewage pumping station by-passes allowing the discharge of raw sewage either overland or to any water course shall be permitted.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 705.07 Force Mains.

(a) Force mains for constant speed pumps shall be sized to yield a cleansing velocity of 3 feet per second or greater at design pump capacity.

(b) Force mains for variable speed pumps shall be sized to yield a velocity of 2 feet per second or greater at average daily design flow.

(c) Force mains shall be provided with automatic air relief valve(s) at high points to prevent air locking.

(d) Force mains shall enter the gravity sewer system at the flow line of the receiving manhole.

(e) Force mains shall be provided with drainage blow-offs, properly valved, at low points. Space shall be available at such locations for handling the displaced waste without danger of pollution or health hazard.

(f) Force mains shall be designed in accordance with Env-Wq 704.04, constructed with materials as specified in Env-Wq 704.06, and tested as specified in Env-Wq 704.08.

(g) Thrust blocks made from inorganic, corrosion-resistant material shall be placed at all bends, elbows, tees, and junctions.

(h) Force mains shall be designed to withstand hydrostatic pressures of at least 2.5 times the design total dynamic head;

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

PART Env-Wq 706 SITING AND DESIGN OF WWTPs

Env-Wq 706.01 WWTP Location.

(a) WWTPs shall be located and designed such that the impact of possible odor problems and safety and health problems to the adjacent properties are minimized to the extent practicable.

(b) Factors to consider when siting a WWTP shall include, but not be limited to, the following:

(1) The type of WWTP to be constructed and the level of odors that typically are generated by that type of WWTP;

(2) The current and projected land use surrounding the proposed site;

(3) The current and projected population surrounding the proposed site;

(4) The direction of prevailing winds in relation to populated areas;

(5) The proposed location’s susceptibility to flooding;

(6) Regionalization options of WWTPs for sewage and septage receiving;

(7) Impacts to surface waters, wetlands, habitat, and wildlife, including any threatened or endangered species;

(8) Traffic impacts on surrounding areas; and

(9) Potential for effluent reuse.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 706.02 Buffer Distances. Buffer distances shall be as follows:

(a) Wastewater treatment ponds shall be located not closer than 600 feet from any residence; and

(b) Processing units in a conventional WWTP shall be located not closer than 300 feet from any residence.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 706.03 Flooding. WWTPs shall be:

(a) Designed to provide for uninterrupted operation of all process units during flooding conditions of a 25-year frequency; and

(b) Be placed above or otherwise protected against the 100-year flood levels.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 706.04 Effluent Quality. The degree of treatment provided at a WWTP shall be designed to meet the effluent discharge limitations and water quality standards established by applicable provisions of:

(a) The state surface or ground water discharge permit;

(b) Env-Ws 1700, relative to surface water quality standards;

(c) The federal surface water discharge permit; or

(d) The Clean Water Act.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 706.05 Basis of WWTP Design.

(a) The WWTP design shall provide flexibility for operating within the expected range of wastewater characteristics and volumes.

(b) The owner shall submit a basis of design report as described in Env-Wq 706.06 to the department for review and approval prior to final design.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 706.06 Basis of Design Report.

(a) Relative to general WWTP information, the basis of design report shall address the following:

(1) Character and use of the receiving waters;

(2) Existing and projected flow;

(3) Flow composition;

(4) Location and topography of the WWTP site;

(5) The design period for the WWTP, which must be not less than 20 years;

(6) Present permit limits, if any;

(7) The effect on the wastewater treatment process of industrial wastes likely to be encountered in the influent waste stream;

(8) Ultimate sludge disposal plans, including contingency plan as required by Env-Wq 713 for sludge stabilization, sludge thickening, and sludge dewatering;

(9) Estimates of capital and operating costs;

(10) Design calculations and parameters used for sizing the unit processes and components; and

(11) For a proposed modification or addition to an existing WWTP, a construction sequence for maintaining WWTP operations and permit compliance during construction and testing.

(b) Relative to waste characterization, the basis of design report shall address the following:

(1) Domestic waste strength and peaking factors based on historical records, if records exist;

(2) If no records exist, domestic waste strength and peaking factors based on:

a. An average daily per capita contribution of 0.20 pounds of TSS and 0.17 pounds of BOD, if garbage grinders are not prevalent in the area;

b. An average daily per capita contribution of 0.25 pounds of TSS and 0.22 pounds of BOD, if garbage grinders are prevalent in the area;

c. An average daily per capita contribution of 0.04 pounds of total nitrogen;

d. An average daily per capita contribution of 0.006 pounds of total phosphorous; and

e. Not less than 70 gallons of flow per capita per day nor more than 100 gallons of flow per capita per day.

(3) Industrial wastes, if present, quantified and characterized as follows:

a. Use an industry-by-industry chemical analysis from existing pretreatment programs including conventional pollutants (BOD and TSS), nutrients, pH, and non-conventional parameters potentially present in the waste stream; or

b. In the absence of existing pretreatment programs, full waste characterization shall be performed; and

(4) Septage receiving and treatment capacity, based on:

a. The septage volume and characterization expected to be received during the planning period of the WWTP;

b. Septage strength of 6,500 mg/l BOD, 12,900 mg/l TSS, 590 mg/l total kjeldahl nitrogen (TKN), and 210 mg/l total phosphorous, if specific data is not available; and

c. Appropriate peaking factors to account for seasonal variations in septage quantities from the specific service area.

(c) Relative to design loadings, the basis of design report shall address the following:

(1) An evaluation of future expansion requirements in excess of the 20-year planning period, when laying out and designing major treatment units and WWTP hydraulics;

(2) Design flows for domestic, commercial, industrial and infiltration/inflow (I/I) flows, as applicable;

(3) Stormwater flows, for WWTPs with combined sewers within the service area;

(4) Design flow values, including the following:

a. Annual average flows;

b. Peak hourly flow;

c. Maximum daily flow;

d. Maximum monthly flow;

e. Minimum monthly flow; and

f. Minimum daily flow;

(5) Total influent TSS and BOD loading, calculated as the sum of domestic, commercial, industrial, and septage loads throughout the design period of the WWTP;

(6) A mass balance, performed as follows:

a. The mass balance shall be prepared for average conditions and appropriate peaking factors used for peak design conditions;

b. The mass balance shall include BOD and TSS loadings for each appropriate process and for all side streams;

c. The mass balance shall include nutrient loadings when the WWTP is designed for nutrient removal; and

d. Sidestream flows returned to the liquid treatment process as the result of sludge, scum, or other floatable matter processing shall be characterized as to solids and organic content, with the characterization being included in the design loadings for both liquid and solids treatment processes.

(d) Relative to WWTP hydraulics, the basis of design report shall address the following:

(1) Hydraulic profiles of each treatment process on the design drawings indicating water surface elevations for peak hourly and annual average design flows against 25-year flood and average levels of the receiving waters;

(2) Hydraulic design under peak hourly flow conditions, including associated sidestream flows, to be passed through the WWTP with the largest or longest flow path of each unit process removed from service;

(3) Design allowance for maximum flows to pass through the WWTP when and if the largest pump or other piece of mechanical equipment is out of service; and

(4) A minimum velocity of 2.0 feet per second at design annual average flow and 1.5 feet per second at minimum flow in channels carrying unsettled wastewater unless wastewater is managed to prevent sedimentation of solids.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 706.07 Additional WWTP Requirements.

(a) For items of equipment that are essential to the treatment process, a representative of the manufacturer shall inspect the installation and supervise the initial operation.

(b) Multiple units shall be provided for all critical components. For pumps and critical hydraulic components, the WWTP shall have one standby unit for every 3 units, or fraction thereof, required to handle peak design flow or load.

(c) The WWTP shall be designed to facilitate unit process maintenance such that:

(1) Each unit of the WWTP can be removed from service independently;

(2) The design facilitates WWTP operation during unit maintenance and emergency repair so as to minimize deterioration of effluent quality;

(3) Solids retention, sludge handling, and disinfection are addressed as specified in this chapter; and

(4) WWTP by-passes that allow raw or insufficiently treated sewage to be discharged directly to a water course are prevented.

(d) For WWTP upgrade or expansion, the technical specifications prepared per Env-Wq 703.02 shall include a detailed description of how to maintain existing WWTP operations, delineating the suggested construction sequence and number of units to be removed from treatment operation.

(e) A means of unit isolation and dewatering shall be provided for each process unit.

(f) Each tank shall be:

(1) Capable of being dewatered individually; and

(2) Protected against flotation.

(g) Piping and channels throughout the WWTP shall be designed to carry the maximum design flows as follows:

(1) Gravity influent sewers shall not be surcharged during normal operating conditions;

(2) Bottom channel corners shall be filleted, with the elimination of pockets and corners where solids can accumulate;

(3) Suitable gates shall be placed in channels to seal off unused sections that might accumulate solids;

(4) Noncorrodible materials shall be used for gates; and

(5) Channels that may not be used for considerable periods of time shall have valved drains.

(h) Flow distribution devices shall be designed to:

(1) Control organic, solids**,** and hydraulic loading to WWTP process units;

(2) Provide distribution to individual treatment units by using inlet weirs in distribution boxes or influent channels with outlet ports or weirs that impart sufficient head loss to ensure equal distribution among all units;

(3) Use control valves when sufficient head is not available to use weirs or distribution boxes;

(4) Provide visible status indication for influent flow to each unit via weirs, sluice gates, slide gates, control valves**,** or other means;

(5) Provide positive scum and foam removal in all channels and distribution structures that have a trapped-free surface; and

(6) Not rely on effluent weirs and flow route symmetry for flow control.

(i) Design and layout of WWTPs, including building interiors and mechanical layouts, shall include provisions for future expansion and upgrades as follows:

(1) Locations of future facilities shall be indicated on the construction drawings;

(2) WWTP hydraulics, sizing of conduits connecting unit processes, and flow distribution shall provide for future expansion; and

(3) Plugs, blind flanges, sluice gates, and valving shall be designed to facilitate expansion with minimal disruption to operating facilities.

(j) General equipment design shall meet the following criteria so as to allow for the continuous supply of accurate amounts and rates of chemicals throughout the range of feed requirements:

(1) Materials and surfaces that will come in contact with chemicals or solutions thereof shall be resistant to the chemicals and their solutions, with corrosive chemicals being introduced in a way that minimizes the potential for corrosion;

(2) Chemicals that are incompatible shall not be stored or handled together;

(3) A separate feeder shall be used for each chemical applied;

(4) Chemical feeders shall be manually and automatically controlled with the automatic controls designed to allow override by the manual controls;

(5) Chemical feed rates shall be adjustable based on appropriate control parameters;

(6) Dry chemical feeders shall measure chemicals volumetrically or gravimetrically and provide adequate solution water and agitation of the chemical in the solution tank;

(7) Water supply for chemical feed applications, when needed, shall be sufficient in quantity and pressure for the intended application;

(8) A means of measuring supply water shall be provided when preparing specific solution concentrations by dilution;

(9) The water supply shall be treated as necessary to ensure compatibility with its intended use;

(10) Chemical feed equipment shall be located in a dedicated room or area to reduce hazards and dust problems;

(11) The length of feed lines shall be minimized by locating the equipment as close to the application point(s) as practical;

(12) The chemical feed equipment shall be accessible for servicing, repair, and observation of operation;

(13) Liquid chemical storage tanks in excess of 55 gallons shall have a liquid level indicator and:

a. An overflow and a contained receiving basin; or

b. A drain capable of receiving and containing accidental spills or overflows equal in volume to 110 percent of the storage tank capacity;

(14) All liquid chemical storage tanks shall be properly labeled;

(15) The day tank or solution tank, if provided, shall provide a means to maintain a uniform solution strength;

(16) Overflow pipes shall:

a. Have a submerged discharge to a containment vessel;

b. Be visible to the operator under normal operating conditions; and

c. Be marked to designate the pipe’s origin tank and the chemical being conveyed;

(17) Acid storage tanks shall be vented to the outside atmosphere through separate vents, with each tank having a valved drain to protect against backflow;

(18) Feed lines shall be:

a. As short as possible;

b. Durable, corrosion-resistant material;

c. Easily accessible along the line’s entire length;

d. Protected from freezing;

e. Readily cleanable; and

f. Color coded and labeled

(19) Color coding of WWTP piping and chemical feed lines shall:

a. For upgrades to existing plants, comply with either the existing WWTP color coding system or section 4.4.6 of TR-16, 1998 Edition; and

b. For all new WWTPs, comply with color codes specified in section 4.4.6 of TR-16, 1998 Edition;

(20) When conveying gases, the feed lines shall slope upward from the chemical source to the feeder;

(21) Feed line material shall be compatible for use with the water, chemical, solution, or mixtures that the line conveys;

(22) Carts, elevators, hoists, and other appropriate means for lifting chemical containers shall be provided;

(23) Provision shall be made for the proper transfer of dry chemicals from shipping containers to storage bins or hoppers, in a way that minimizes dust entering the room where the equipment is installed;

(24) Ventilation or personal protection, or both, shall be provided to prevent operator exposure to dust and chemicals, whether in the storage, transfer or application areas;

(25) Vents from feeders, storage facilities, and equipment exhaust shall discharge to the outside atmosphere above grade and away from air intakes;

(26) Provision shall be made for measuring quantities of chemicals used to prepare feed solutions; and

(27) Interior floor drains in chemical storage areas shall discharge to a holding tank.

(k) Operation and maintenance manuals providing information and guidance for day-to-day operation of the WWTP and pump stations shall be submitted within 60 days following completion of construction of the WWTP or sewage pumping station(s).

(l) The operation and maintenance manuals cited in (k) above shall include, at a minimum, the following:

(1) Information on process design assumptions;

(2) Unit process information that includes control measures and monitoring procedures for the various processes;

(3) Start-up procedures for each unit operation and piece of equipment;

(4) Maintenance management systems;

(5) Laboratory test procedures;

(6) Safety procedures;

(7) Organizational structure and administrative procedures;

(8) Troubleshooting procedures;

(9) Emergency operation plan;

(10) Staffing requirements;

(11) Process and instrumentation diagrams; and

(12) Checklists for systems and components for the operator's use in developing a maintenance program for pump stations and WWTPs.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 706.08 Site Access.

(a) WWTP access roads shall provide access to all delivery and loading points.

(b) Roadway design and construction details shall be as required for the types of vehicles that will access the site and in accordance with local regulations.

(c) Access to the site shall be controlled with a perimeter fence and lockable gate(s).

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 706.09 Site Grading.

(a) Grading or drainage systems for the WWTP site shall be designed to handle surface runoff.

(b) All-weather walkways shall be provided for access to all units.

(c) Surface water shall not be permitted to drain into any process unit.

(d) Drains and runoff in areas contaminated by sludge or wastewater shall discharge to the treatment facilities for processing.

(e) Drainage from chemical storage and handling areas shall discharge to the WWTF for processing.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 706.10 Outside Lighting. Outside units, tanks, equipment, and work areas shall be lit so as to allow safe inspection of the facility.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 706.11 Floor Slope. Floor surfaces shall be sloped to allow drainage to a point of collection such as a sump or drain.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 706.12 Access to Equipment.

(a) Suitable openings, hatches, or other means shall be provided for removal of machinery and equipment.

(b) Openings shall be large enough to allow for removal of the largest piece of equipment or largest component if equipment is disassembled.

(c) Lifting devices, properly sized for the required loads, shall be provided for removal of equipment.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 706.13 Essential Power Requirements for WWTPs. Power shall be provided at all times to operate essential equipment including, but not limited to:

(a) Preliminary treatment;

(b) Influent pumping;

(c) Primary treatment;

(d) Intermediate pumping;

(e) Disinfection;

(f) Effluent pumping;

(g) Lighting and ventilation that is essential to the safe operation of the WWTP; and

(h) Alarm systems and essential controls.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 706.14 Essential Water Supply Requirements for WWTPs.

(a) A pressurized potable water supply shall be provided for fire fighting and use in the WWTP.

(b) No piping or other connections shall exist in any part of the WWTP or collection system that might cause the contamination of a potable water supply.

(c) The chemical quality of the water supply shall be checked for suitability for its intended uses such as heat exchangers and chlorinators.

(d) Potable water from a municipal or separate supply may be used directly at points above grade for the following hot and cold supplies with no additional backflow protection:

(1) Lavoratory sinks;

(2) Toilets;

(3) Showers;

(4) Drinking fountains;

(5) Laboratory sinks, if protected against back siphoning; and

(6) Slop sinks, if protected against back siphoning.

(e) All potable water supply mains shall be protected against contamination with a reduced-pressure-zone backflow preventer that meets the requirements of Env-Ws 364, including local approval if required.

(f) Hot water for any unit cited in (d), above, shall not be taken directly from a boiler used for supplying hot water to a sludge heat exchanger, digester heating coils, or similar process.

(g) Where a public water supply is not available, a separate drilled well shall be provided as a potable water supply.

(h) Where ~~a~~ potable water supply will be used for any purpose other than those listed in (d), above, a backflow protection device that meets the requirements of Env-Ws 364, including local approval if required, shall be installed.

(i) Vacuum breakers shall be installed on the water supply to the laboratory.

(j) The number of backflow devices required shall be minimized by providing a separate, non-potable, in-plant water system using a single backflow protection device.

(k) A sign shall be permanently posted at each hose bib, sill cock, or other fixture on the non-potable water system indicating that the water is not safe for drinking.

(l) Where break tanks are used for backflow prevention, water shall discharge to the break tank through an air-gap at least 6 inches above the maximum flood line or the spill line of the tank, whichever is higher.

(m) Where a separate non-potable water supply will be provided, a backflow prevention device shall not be required.

(n) Hydrants for fire protection and hydrants for yard use shall:

(1) Be clearly distinguished from one another with different paint colors; and

(2) Have different-sized nozzles for hose connections.

(o) Locations of fire protection hydrants shall be approved by the appropriate local official.

(p) Hydrants fed by the potable water supply system shall be protected from cross-contamination as required by the owner of the water system.

(q) Toilets and showers shall be provided for the projected number of operators with separate toilets and showers for men and women.

(r) Slop sinks for general cleaning shall be provided.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 706.15 Wastewater Flow Measurement.

(a) Means for measuring, recording, and totaling both raw influent flow prior to sidestreams and effluent wastewater flow after WWTP water withdrawal shall be provided.

(b) Provisions for measuring, recording, and totaling the flow of return activated sludge, primary sludge, waste secondary sludge, and other major sludge streams shall be provided.

(c) All flow measurement equipment shall be:

(1) Sized to perform effectively over the full range of expected flows; and

(2) Protected against freezing.

(d) Installation of flow measuring equipment shall be such that the required hydraulic conditions necessary for accurate measurement are provided.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 706.16 Sampling.

(a) Sampling sites shall:

(1) Be readily accessible by WWTP personnel;

(2) Not be located in confined space areas;

(3) Be free of tripping, slipping, and falling hazards;

(4) Have a supply of electrical power with a ground fault interrupt; and

(5) Be supplied with batteries or connected to the emergency power source.

(b) Samplers shall be housed in enclosed and, if needed, heated structures to prevent freezing.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 706.17 WWTP Outfalls.

(a) Provision shall be made for effective dispersion of the effluent into the receiving water body so as to meet the water quality criteria as specified in Env-Ws 1700.

(b) The outfall pipe outlet(s) shall be submerged at all times.

(c) The outfall pipe shall be so constructed and protected against the effects of flood water, tides, ice, or other hazards as to reasonably ensure its structural stability and freedom from stoppage.

(d) Outfall pipes shall not impede or otherwise interfere with navigation.

(e) A manhole shall be provided at the shore end of all gravity outfall sewers extending into the receiving stream.

(f) Outfall pipe and fittings shall be constructed of ductile iron, HDPE, or PVC material.

(g) All ductile iron pipe shall be corrosion protected if installed in a corrosive environment that could reduce the typical life expectancy of the pipe.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 706.18 Safety. The following features shall be incorporated into the design and construction of WWTPs for the protection of visitors and facility operations staff:

(a) Hand rails, guards, safety netting, and barricades around tanks, trenches, pits, stairwells, floor openings, maintenance access areas, and other hazardous structures;

(b) Gratings over areas of treatment units where access for maintenance is required;

(c) First aid equipment;

(d) Appropriately placed warning signs and labels as per NFPA 704 (2001) and New Hampshire department of labor requirements as specified in Lab 1400 in, but not limited to, the following areas:

(1) Slippery areas;

(2) Non-potable water fixtures;

(3) Low head clearance areas;

(4) Open service manholes;

(5) Hazardous chemical storage areas

(6) Flammable fuel storage areas; and

(7) Confined spaces;

(e) Personal protective clothing and equipment as per New Hampshire department of labor requirements as specified in Lab 1400, to include:

(1) Eye, ear, and face protection;

(2) Respiratory protection; and

(3) Head, hand, and foot protection.

(f) Gas detectors for use in occupied areas rated under the NEC as Class 1, Division 1, Group A, B, C, and D locations;

(g) Provisions and equipment for permit-required confined space entry in accordance with New Hampshire department of labor requirements as specified in Lab 1400;

(h) Ventilation of enclosures in accordance with NFPA 820 (2003);

(i) Fire protection systems and equipment; and

(j) Machinery guards around belts or other moving parts.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 706.19 Hazardous Chemical Handling.

(a) The materials used for storage, piping, valves, pumping, metering, and splash guards shall be specially selected so as to be compatible with the physical and chemical characteristics of each hazardous or corrosive chemical that will be used at the WWTP.

(b) Chemical storage areas shall be enclosed in dikes or curbs that will contain the stored volume until the spilled chemical can be safely transferred to alternative storage or released to the wastewater at controlled rates that will not damage facilities, inhibit the treatment processes, or contribute to stream pollution.

(c) Eye wash fountains and deluge showers using potable water shall be:

(1) Provided in the laboratory and on each floor or work location involving hazardous or corrosive chemical storage, mixing or slaking, pumping, metering, or transportation loading;

(2) As close as practicable to possible chemical exposure sites; and

(3) Fully usable during all weather conditions.

(d) Eye wash fountains and deluge showers shall be supplied with water from 50º to 90º F (10º to 32º C), separate from the hot water supply, and suitable to provide a minimum of 15 minutes of continuous irrigation. Self contained eye wash fountains or eye wash stations shall be acceptable.

(e) All piping containing or transporting corrosive or hazardous chemicals shall be identified with labels every 10 feet and with at least 2 labels in each room, closet, or pipe chase. Pipes containing hazardous or corrosive chemicals shall not be located above shoulder level except where continuous drip collection trays and coupling guards will eliminate chemical spray or dripping onto personnel.

(f) All pumps, feeders, connections, and couplings for hazardous or corrosive chemicals shall have guards that will effectively prevent spray of chemicals into space occupied by personnel. The splash guards shall be in addition to guards intended to prevent injury from moving or rotating machinery parts.

(g) All hazardous waste generated shall be managed in accordance with RSA 147-A and Env-Wm 100-1100 or their successor rules in subtitle Env-Hw.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 706.20 Laboratory Equipment.

(a) Subject to (b), below, all WWTPs shall include a laboratory and the equipment needed for wastewater analysis, process control tests, discharge permit tests, and quality control analysis checks.

(b) If the owner chooses to not include a laboratory in the WWTP, the owner shall contract with an outside laboratory for all testing services specified in (a), above.

(c) Laboratories shall be ventilated properly with external air supply for 100 percent makeup volume. Separate exhaust ventilation shall be provided. Ventilation exhaust outlets shall not be located near ventilation inlets. Exhaust ventilation shall be provided for all hoods.

(d) Laboratory floor surfaces shall be slip-resistant and fire-resistant, as well as highly resistant to acids, alkalis, solvents, and salts.

(e) The laboratory shall have at least 2 exit doors, with glass windows for easy visibility, to allow for straight egress. Panic hardware shall be installed on all doors.

(f) Vacuum break type faucets shall be supplied for laboratory sinks. Plumbing shall be based on the types of substances that may be discarded in the drain lines, with acid- or chemical- resistant waste drain lines being installed as needed.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 706.21 Alarms.

(a) Alarm systems shall be included to notify WWTP operators of any circumstance or condition that threatens public health or safety or the ability of the WWTP to provide adequate treatment of the wastewater in accordance with the effluent limitations set forth in the discharge permit.

(b) A 24 hour per day, 7 day per week notification system shall be installed at the WWTP control room. Where a WWTP is not manned on a 24 hour per day basis, an additional notification system shall be installed at the police station, fire station, or any other locale having 24 hour per day manning, including a commercial answering service.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

PART Env-Wq 707 SCREENING, GRIT REMOVAL, AND FLOW EQUALIZATION

Env-Wq 707.01 Grinding and Screening Devices.

(a) All WWTPs shall be provided with mechanical means for grinding or screening the sewage. Operation of such mechanically-cleaned devices shall be continuous or automatically controlled.

(b) Grinding and screening devices installed in a building where other equipment or offices are located shall be separated from the rest of the building, provided with separate outside entrances, and provided with mechanical ventilation.

(c) Clear openings between bars shall be from 1.0 to 1.75 inches for by-pass screens. Clearance for coarse racks or screens preceding mechanically-cleaned screens or grinders may be greater than 1.75 inches. Design and installation of manually cleaned screens shall be such that they can be cleaned. Manually cleaned screens, except those for emergency use, shall be placed on a screen slope of 30 to 45 degrees with the horizontal.

(d) Clear openings for mechanical screens shall be sized ½-inch or less to maximize removal of inert material.

(e) For manually cleaned bar screens, the screen chamber shall be designed to provide a velocity through the screen of one foot per second at an average rate of flow. For mechanically cleaned screens, maximum velocities during wet weather periods shall not exceed 2.5 feet per second. The velocity shall be calculated based on the vertical open cross-sectional area below the flow line.

(f) The screen channel invert shall be 3 to 6 inches below the invert of the incoming sewers. To prevent jetting action, the length and construction of the screen channel shall provide for a reestablished hydraulic flow pattern following the drop in elevation.

(g) All mechanical screening units shall be provided with controls that set the cleaning mechanism in operation at a predetermined high water level in addition to having the ability to operate on a timing device.

(h) Facilities shall be provided for removal, handling, storage, and disposal of screenings in a sanitary manner. Manually-cleaned screening facilities shall include an accessible platform from which the operator can rake screenings easily and safely. Drainage facilities shall be provided both for the platform and for storage areas.

(i) Grinding devices shall have slots at least ¼-inch wide and be designed to cut or shred material below the surface of the sewage.

(j) The capacity of all screening and grinding equipment shall be as follows:

(1) If one unit is installed, the unit shall be sized to handle peak hourly flow; and

(2) If multiple units are installed for flexibility of maintenance, the peak hourly flow shall be handled with the largest unit out of service, by the remaining units.

(k) Influent channels shall be equipped with gates to isolate each screening or grinding device. The channel preceding and following the grinder or screen shall be shaped to eliminate settling of solids.

(l) Where a single mechanically-operated screening or grinding device is used, auxiliary manually-cleaned screens shall be provided. The design shall include provisions for automatic diversion of the entire sewage flow through the by-pass screen if the mechanical unit fails.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 707.02 Grit Removal Facilities.

(a) Grit removal facilities shall be provided for all WWTPs for protection of downstream processes and equipment.

(b) If grit is removed by a means that causes the grit to contain excess organics or water, or both, for the method of final grit disposal to be used, the WWTP shall include grit washing and dewatering facilities as necessary. Impervious surfaces with drains shall be provided for grit handling areas. Grit conveying equipment shall be designed to avoid loss of material and protected from freezing. A supply of water under pressure shall be provided for cleanup.

(c) Where a single mechanically-operated grit removal device is used, auxiliary manually-operated grit removal equipment shall be provided. Design shall include provisions for automatic diversion of the entire sewage flow through the by-pass grit removal device should the mechanical unit fail.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 707.03 Flow Equalization. If the WWTP is expected to experience significant variations in organic or hydraulic loadings, the WWTP shall incorporate methods and equipment to address the variations by either:

(a) Flow equalization that meet the following requirements:

(1) Equalization basins shall be located downstream of pretreatment facilities such as bar screens, grinders, and grit chambers;

(2) Aeration or mechanical mixing equipment shall be provided to maintain adequate mixing~~.~~, using corner fillets and hopper bottoms with draw-offs to alleviate the accumulation of sludge and grit;

(3) Aeration equipment shall be sufficient to maintain a minimum of 0.5 mg/l of dissolved oxygen in the mixed basin contents at all times, with an air supply that is isolated from other WWTP aeration requirements to facilitate process aeration control;

(4) Inlets and outlets for all basin compartments shall be suitably equipped with accessible external valves, stop plates, weirs, or other devices to permit flow control and the removal of an individual unit from service; and

(5) Facilities shall be provided to measure and indicate liquid levels and flow rates; or

(b) Alternate means that will ensure that the WWTP operates effectively under the varying conditions.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

PART Env-Wq 708 SETTLING

Env-Wq 708.01 Primary Settling Tanks.

(a) Inlets to primary settling tanks shall be designed to dissipate the inlet velocity and to distribute the flow equally to prevent short-circuiting.

(b) Channels in settling tanks shall be designed to prevent sedimentation. Corner pockets and dead ends shall be eliminated.

(c) Provisions shall be made for elimination or removal of floating materials in inlet structures having submerged ports.

(d) The minimum length of flow from inlet to outlet in rectangular settling tanks shall be 20 feet.

(e) Primary settling tanks shall have a minimum side water depth of 10 feet.

(f) Effective scum collection and removal facilities shall be provided ahead of the outlet weirs on all settling tanks.

(g) Overflow weirs shall be adjustable for leveling.

(h) The tops of troughs, beams, and similar construction features that are submerged shall have a minimum slope of 1.4 vertical to one horizontal.

(i) If primary settling tanks are part of the WWTP design, a minimum of 2 primary settling tanks shall be provided.

(j) All primary settling tanks shall provide safe and easy access for maintenance and protection of operators. Access stairways and elevated walkways shall be equipped with handrails. Walls of primary settling tanks shall extend a minimum of 6 inches above the surrounding ground surface, be provided with safety railings, and have not less than 12 inches freeboard.

(k) For sludge removal from primary settling tanks, provision shall be made for:

(1) Sampling and measuring flow of the sludge;

(2) Sludge hoppers to be accessible for maintenance from the operating level; and

(3) For sludge hoppers in rectangular settling tanks, a 1.7 horizontal to one vertical minimum slope of the side walls.

(l) Settling tanks designed for use without mechanical equipment for sludge collection and removal shall be prohibited.

(m) Air lift type of sludge removal shall be prohibited. Primary sludge shall be removed from the sludge hoppers by positive displacement pumps with timers for control of pumping periods.

(n) Combined units employing settling and digestion processes shall be prohibited.

(o) Average surface overflow rates for primary settling tanks shall not exceed 600 gpd per square foot (gpd/sf) for WWTPs having an average design flow of 1 mgd or less.

(p) Average surface overflow rates for primary settling tanks shall not exceed 1,200 gpd/sf for WWTPs having an average design flow greater than 1 mgd, unless reduced primary removal rates are provided in the design loadings for subsequent secondary treatment units.

(q) Surface settling rates for peak hourly flow shall not exceed 3,000 gpd/sf.

(r) If activated sludge is wasted to the primary tanks, average overflow rates shall not exceed 800 gpd/sf and peak hourly overflow rate shall not exceed 1,200 gpd/sf.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 708.02 Secondary Settling Tanks: Number and Types of Units.

(a) Multiple secondary settling tank units capable of independent operation shall be provided when the average design flow exceeds 40,000 gpd and may be provided for lower average design flows because they still provide benefit at lower flows.

(b) A minimum of 3 independent secondary settling tanks shall be provided when the average daily design flow is equal to or greater than 5.0 mgd.

(c) Secondary settling tanks for activated sludge may be rectangular or circular, and shall be designed to separate and concentrate mixed liquor, provide the required effluent quality, remove settled sludge, and skim, collect, and remove scum and other floatables.

(d) Secondary settling tank walls shall:

(1) Extend at least 6 inches above the surrounding ground; and

(2) Provide not less than 12 inches of freeboard.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 708.03 Secondary Settling Tanks: Design Criteria for Solids Loading.

(a) Secondary settling tanks shall be designed integrally with the design of the aeration basins and sludge return facilities. Secondary settling tank sizing shall be based on solids loadings, sludge settleability, settled sludge concentration, and return sludge rates.

(b) Solids loading shall be calculated as follows:

(1) Peak solids loading rate shall be computed based on the design mixed liquor suspended solids (MLSS) under aeration and the design maximum daily flow rate plus the corresponding recycle rate required to maintain the design MLSS;

(2) Allowable solids loading rates shall be determined using solids flux analysis, expected sludge characteristics, and a settling tank factor of safety of 1.3 to 1.5;

(3) Settling tank area shall be determined based on the maximum day solids loading rate divided by the allowable design loading rate.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 708.04 Secondary Settling Tanks: Design Criteria for Overflow Rates.

(a) Subject to (b), below, the design overflow rates shall be determined from solids flux analysis and solids loadings.

(b) In lieu of (a), above, activated sludge settling tanks treating domestic wastes may be sized according to Table 708-1 below, wherein overflow rates are based on solids flux with a factor of safety of 1.3 against settling tank failure, overflow rates for systems with a selector are based on settling characteristics typical of mixed liquor with a sludge volume index (SVI) of 150 ml/g, and overflow rates for systems without selectors are based on settling characteristics typical of a mixed liquor with a SVI of 200 mL/g:

TABLE 708-1 Secondary Settling Tank Overflow Rates for Maximum Daily Flow

MLSS, mg/l	**Return Activated Sludge (RAS), mg/l**	**Overflow Rates - Design Includes Selectors, gpd/sf**	**Overflow Rates - Design Includes No Selectors, gpd/sf**
1,500	7,000	1,700	1,500
2,000	8,000	1,400	1,000
2,500	9,000	1,100	580
3,000	9,000	770	450

(c) Side water depth for secondary settling tanks shall be as follows:

(1) For rectangular units , 12 to 13 feet;

(2) For circular units up to 40 ft diameter, 12 feet;

(3) For circular units 40 feet to 75 feet diameter, 14 feet;

(4) For circular units 75 feet to 125 feet diameter, 16 feet; and

(5) For circular units greater than 125 feet diameter, 18 feet.

(d) Circular settling tanks shall have a minimum bottom slope of 0.25 inches per foot.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 708.05 Secondary Settling Tanks: Design Criteria for Inlets and Outlets.

(a) Inlets shall be designed to minimize short-circuiting and to distribute flow across the entire settling tank.

(b) Scum gathering in the inlet area shall be minimized.

(c) V-notch weirs shall be provided for all outlets. Head over the base of the V-notch shall be less than the depth of the notch. Weirs shall be adjustable to correct for any differential settlement of the tanks.

(d) Effluent launders shall be designed to convey the maximum instantaneous flow without surcharging.

(e) Launder inverts shall be sloped a minimum of 0.5 percent.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 708.06 Secondary Settling Tanks: Design Criteria for Sludge and Scum Removal.

(a) Sludge collection and withdrawal facilities shall be designed to accommodate the withdrawal of sludge solids.

(b) Circular units shall be designed to allow alternate sludge wasting and tank drainage from the center of the units.

(c) Rapid sludge removal systems in circular settling tanks shall be designed so that return rates can be directly varied by changes in return sludge pumping rates. Sludge collection tubes on rapid sludge removal systems shall have a submerged discharge to the centerwell.

(d) Chain and flight sludge collectors in rectangular settling tanks shall be designed with a minimum horizontal velocity of 2 to 3 feet per minute with flights at least 10 feet on center.

(e) Effective baffling and scum removal equipment shall be provided in each secondary settling tank. Scum removal equipment shall facilitate the positive movement of scum to the scum hoppers.

(f) Scum hoppers shall have provisions to facilitate the flushing of scum from the hopper.

(g) Scum piping shall be sized for proper movement of viscous foams.

(h) In larger settling tanks, or when greater amounts of scum are expected, settling tanks shall be provided with dual skimmers, wider scum hoppers, and a minimum of 8-inch diameter scum hopper piping.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 708.07 Secondary Settling Tanks: Design Criteria for Return Sludge.

(a) Return sludge rate capabilities shall be designed within the ranges of the average day design flow listed in Table 708-2, below:

Table 708-2 Return Sludge Rate Capabilities

Type of Process	**Minimum**	**Maximum**
Conventional	15%	100%
Step Aeration	20%	100%
Contact Stabilization	30%	100%
Extended Aeration	30%	150%

(b) At least one return sludge pumping unit shall be provided for each settling tank. The maximum required return sludge capacity shall be available with the largest pumping unit out of service. Pumps may be placed on suction headers, but the arrangement and valving shall be such that any one settling tank can be isolated with a single pump.

(c) A positive suction head shall be provided for all return sludge pumps.

(d) Return sludge pumps shall have at least 3-inch suction and discharge openings.

(e) Rate of sludge return shall be varied by means of variable speed motors, drives, or timers.

(f) Return sludge suction and discharge piping shall be at least 4 inches in diameter and designed to maintain a velocity of not less than 2 feet per second when operating at average sludge return rates.

(g) Suitable devices shall be provided for sampling and measuring return sludge flow rates. Measuring devices shall totalize and record, as well as indicate flows.

(h) Capability shall be provided to return and waste sludge concurrently.

(i) Provisions shall be made for the draining and flushing of discharge lines.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 708.08 Secondary Settling Tanks: Design Criteria for Waste Sludge.

(a) Means for measuring, sampling, and controlling the rate of waste activated sludge flow shall be provided. Measuring devices shall totalize and record, as well as indicate flows.

(b) Waste sludge shall be discharged to primary settling tanks, units for concentrating the waste sludge, storage tanks, digesters, dewatering devices, or to other means of direct removal from the plant.

(c) Waste sludge facilities shall be designed to pump the expected minimum and maximum rates of wasting.

(d) Provisions shall be made for the draining and flushing of discharge lines.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 708.09 Secondary Settling Tanks: Design Criteria for Bulking Sludge Control.

(a) All activated sludge designs shall include provisions for the control of bulking sludge.

(b) All activated sludge designs shall include provisions to selectively kill filamentous micro-organisms with the addition of an oxidizing agent to the return sludge.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

PART Env-Wq 709 CHEMICAL COAGULATION

Env-Wq 709.01 Chemical Coagulation.

(a) Chemical coagulants shall be applied at a rate proportional to the wastewater flow.

(b) Rapid and thorough mixing of the wastewater and coagulant(s) shall be provided.

(c) If dedicated flocculation tanks are provided, the following shall apply:

(1) At least 2 flocculation tanks having a combined detention period of between 20 and 30 minutes shall be provided;

(2) Diffused air or paddles shall provide a continuous slow rotary agitation of the full content of the flocculation tanks; and

(3) Independent controls for each tank shall be provided.

(d) Settling tank design shall conform to Env-Wq 708.

(e) A means of dewatering all tanks shall be provided.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

PART Env-Wq 710 SUSPENDED GROWTH BIOLOGICAL TREATMENT

Env-Wq 710.01 Activated Sludge: General Design Requirements.

(a) The activated sludge process and its various modifications shall be used only where sewage is amenable to biological treatment. For any WWTP expected to receive abnormally strong concentrations of sewage or to use an unusual aeration period or special equipment or arrangements, at which an activated sludge process is proposed, plans shall be submitted with supporting data obtained from existing similar installations demonstrating the efficacy of the process. All designs shall provide for flexibility in operation.

(b) WWTP design shall provide for multiple aeration tanks capable of passing peak hourly flow with one unit out of service and of meeting process requirements with all units on line.

(c) Where the WWTP design provides for all return sludge to be mixed with the raw sewage or primary effluent at one location, then the mixed liquor flow rate to each aeration unit shall be controlled.

(d) Where primary settling tanks are used, provision shall be made for discharging raw wastewater directly to the aeration tanks to facilitate WWTP start up and operation during the initial stages of the WWTP's design life.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 710.02 Activated Sludge: Aeration.

(a) The aeration tank size for any particular adaptation of the activated sludge process shall be determined by:

(1) Full scale experience at WWTPs treating similar wastewater under similar climatic conditions;

(2) Pilot studies; or

(3) Rational calculations based mainly on solids retention time (SRT) and MLSS levels, provided that other factors, including capacity, diurnal load variations, degree of treatment required, pH, temperature, alkalinity, and dissolved oxygen shall also be considered in the design.

(b) The engineer shall furnish aeration tank sizing calculations to the department.

(c) Aeration requirements for carbonaceous BOD removal shall be based upon the annual average BOD loading.

(d) Aeration requirements for nitrification shall be based on maximum monthly loading.

(e) Aeration tank requirements shall be as follows:

(1) The dimensions of each independent mixed liquor aeration tank or return sludge reaeration tank shall be such as to maintain effective mixing and utilization of air. Liquid depths shall be not less than 10 feet nor more than 25 feet;

(2) Inlets and outlets for each aeration tank unit shall be equipped with valves, gates, stop plates, weirs, or other devices to permit flow control to any unit and to maintain a constant liquid level while preventing short-circuiting through the tank;

(3) Channels and pipes carrying liquids with solids in suspension shall be designed to maintain self-cleansing velocities or shall be agitated to keep such solids in suspension at all rates of flow within the design limits. Piping shall permit flexible operation sequence of tanks and returned sludge inlets;

(4) If a mechanical surface aerator is used, the freeboard shall not be less than 3 feet. All other aeration tanks shall have a freeboard of not less than 18 inches; and

(5) Froth and foam control or removal shall be provided at the aeration tanks.

(f) All aeration equipment shall be capable of maintaining a minimum of 2.0 mg/l of dissolved oxygen in the mixed liquor at all times, providing thorough mixing of the mixed liquor, and preventing deposition of solids at any point in the tanks.

(g) Electrical controls for all aeration equipment shall be protected from the elements.

(h) When pilot facility or experimental data is not available, the design oxygen requirements shall:

(1) Be 0.8 to 1.2 pounds of oxygen per pound design maximum 5-day BOD (BOD_5) based on SRT applied to the aeration tanks;

(2) Be 4.25 pounds oxygen per pound design maximum month TKN available for nitrification, where TKN available for nitrification is calculated as influent TKN less nitrogen required for carbonaceous growth less non-biodegradable nitrogen; and

(3) Include oxygen demands due to high BOD_5 and TKN concentrations in recycle flows such as heat treatment and digester supernatants, vacuum filtrate, belt filter pressate, waste sludge recycled to primary clarifiers and elutriates.

(i) The aeration system shall be designed to match the diurnal organic load variation while economizing on power input.

(j) Dissolved oxygen monitoring via in-place probes shall be conducted in aeration tanks to control power consumption and match oxygen demand with oxygen supply.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 710.03 Activated Sludge: Mechanical Systems.

(a) Diffused air system design shall use data derived from pilot testing or an empirical approach.

(b) Air requirements for a diffused air system shall be determined incorporating the following factors:

(1) Tank depth;

(2) Alpha factor of waste;

(3) Beta factor of waste;

(4) Certified aeration device transfer efficiency;

(5) Minimum aeration tank dissolved oxygen concentration;

(6) Critical wastewater temperature; and

(7) Altitude of WWTP.

(c) The specified capacity of blowers or air compressors shall take into account that the air intake temperature might reach 100°F (38°C) or higher at a relative humidity of 85 percent and the ambient site pressure might be less than normal. The drive motor capacity shall be calculated on the basis of air intake temperature of -22 °F (-30 °C) or less. The design shall include means of controlling the rate of air delivery to prevent overheating or damage to the motor.

(d) Blowers for diffused air systems shall be provided in multiple units, so arranged and in such capacities as to meet the maximum air demand with the single largest unit out of service. The design shall also provide for varying the volume of air delivered in proportion to the load demand of the WWTP. The aeration equipment shall be adjustable in increments so as to maintain solids suspension.

(e) Blowers shall be located in a room which is separated from the office, laboratory, or control room by insulated walls to minimize blower noise. The noise level shall not exceed 90 decibels in the blower room nor exceed 50 decibels in the office, laboratory, or control room. Mechanical ventilation of the blower room shall be provided.

(f) Diffusers shall be spaced to satisfy oxygenation requirements through the length of the channel or tank, and to facilitate spacing adjustments without major revisions to the existing air header piping.

(g) Each aeration drop leg shall be equipped with control valves that have indicator markings for throttling and complete shut off. Air flow measurement capability at each drop leg shall be provided.

(h) Air filters shall be provided in numbers, arrangement, and capacities to furnish at all times an air supply sufficiently free from dust to prevent damage to blowers and clogging of the diffuser system used. A means to measure pressure drop across the air filters shall be provided.

(i) Mechanical aeration systems shall comply with the following:

(1) The mechanism and drive unit for oxygen transfer shall be designed for the expected conditions in the aeration tank in terms of the power performance. The mechanical aerator performance shall be verified by certified testing;

(2) In the absence of specific design information, the oxygen requirements shall be calculated using a transfer rate not to exceed 3.5 pounds of oxygen per horsepower per hour in clean water under standard conditions. Design transfer efficiencies shall be included in the specifications; and

(3) A mechanical aeration system shall be designed so as to accomplish the following:

a. Maintain a minimum of 2.0 mg/l of dissolved oxygen in the mixed liquor at all times throughout the tank or basin;

b. Maintain all biological solids in suspension;

c. Meet maximum oxygen demand and maintain process performance with the largest unit out of service;

d. Provide for varying the amount of oxygen transferred in proportion to the load demand on the WWTP; and

e. Provide that motors, gear housing, bearings, grease fittings, etc., be easily accessible and protected from submergence and spray as necessary for proper functioning of the unit.

(j) Where extended cold weather conditions occur, the aerator mechanism and associated structure shall be protected from freezing due to ice formation from splashing.

(k) Return sludge equipment shall comply with the following:

(1) The return sludge rate shall be varied by means of variable speed motors, drives, or timers. All designs shall provide for flexibility in operation. The return sludge rate shall be at least 100 percent of average annual influent design flow and sufficient to maintain design MLSS at maximum day flow rates;

(2) The maximum return sludge capacity shall be obtained with the largest pump out of service; and

(3) A method for observing, sampling, and controlling return activated sludge flow from each settling tank shall be provided.

(l) Waste sludge facilities shall comply with the following:

(1) In addition to capacity required for return sludge pumping, waste sludge pumping facilities shall be provided with a minimum capacity not less than 25 percent of design average rate of wastewater flow, or a minimum of 10 gallons per minute, whichever is larger. Waste sludge pumps shall function satisfactorily at 0.5 percent of design annual average wastewater flow;

(2) Waste activated sludge may be discharged to the primary settling tanks, aerobic sludge digestion tanks, sludge thickening or dewatering processes, storage tank or any practical combination of these units; and

(3) A method for observing, sampling and controlling waste activated sludge flow shall be provided.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 710.04 Oxidation Ditches.

(a) Oxidation ditch design shall be based on experience at other comparable facilities and meet the applicable requirements of Env-Wq 710.01 through Env-Wq 710.03 except as modified in this section.

(b) Oxidation ditch design shall comply with the following requirements:

(1) Ditches shall be interconnected such that either ditch can be taken out of service temporarily and the ditches can be operated either in series or in parallel; and

(2) Minimum horizontal velocity shall be not less than one foot per second.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 710.05 Sequencing Batch Reactors.

(a) Sequencing batch reactor (SBR) design shall be based on experience at comparable facilities and meet the applicable requirements of Env-Wq 710.01 through Env-Wq 710.03 except as modified in this section.

(b) SBRs shall be designed and constructed to allow for static fill, mixed fill, and aerated fill to allow for operational flexibility.

(c) More than 2 tanks shall be provided, unless one of the following is provided:

(1) An influent flow equalization tank sized to hold a minimum of 2 design capacity decantable volumes; or

(2) Provisions to allow SBR tanks to operate in a continuous flow-through mode during emergency operations.

(d) System sizing shall be based on aerated SRT.

(e) System reliability with any single SBR tank out of service and the instantaneous flow delivery shall be evaluated in the design of decanter weirs and approach velocities.

(f) The decanter shall not create a vortex or take in floatables or sludge.

(g) Scum removal shall be provided.

(h) The SBR design shall include in-place dewatering capability and provisions for transferring mixed liquor between the SBR tanks.

(i) Each SBR tank shall be capable of wasting sludge during each cycle.

(j) If blowers are provided, blowers shall be provided in multiple units, so arranged and in such capacities as to meet the maximum air demand in the aerated portions of the fill-react and react phases of the cycle with the single largest unit out of service.

(k) Mechanical mixing independent of aeration shall be provided for all systems where biological phosphorous removal or denitrification is required, with mixing equipment sized to thoroughly mix the entire basin from a settled condition within 3 minutes without aeration.

(l) Post-SBR tank flow equalization shall be provided to equalize flow variations and designed to meet the following criteria:

(1) Hold a minimum of one design capacity decantable volume;

(2) Provide a means to return the decanted effluent to the headworks for additional treatment; and

(3) Provide a means to remove solids from the tank bottom.

(m) An automatic process control having an uninterruptible power supply with electrical surge protection shall be provided.

(n) Manual override shall be provided in addition to automatic process control. Both automatic and manual controls shall allow independent operation of each tank.

(o) Controls shall allow at least 20 minutes of settling between the react and decant phases.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 710.06 Aerated Lagoon Design: General Requirements.

(a) To develop final design parameters for aerated lagoons, actual operating data shall be used, if available.

(b) If actual data is not available, the aerated lagoon system design for minimum detention time in days (t) shall be estimated for each aerated cell by dividing the percent of BOD_5 to be removed in the aerated lagoon (E) by the product of 2.3 multiplied by the reaction rate coefficient for an aerated lagoon in base 10 (k_1) multiplied by the result of subtracting E from 100, as shown in the following formula:

$$t = \frac{E}{2.3k_1(100-E)}$$

(c) For purposes of (b), above, the reaction rate coefficient (k_1) shall be as follows:

(1) For normal domestic wastewater, 0.12/day at 68°F (20°C) and 0.06/day at 34°F (1°C) unless data is available to indicate a more appropriate k_1 value for the specific site;

(2) For domestic wastewater that includes some industrial wastes, other wastes, and partially treated wastewater, as determined experimentally for various conditions which might be encountered in the aerated ponds; and

(3) Conversion of the reaction rate coefficient to other temperatures shall be made based on experimental data.

(d) There shall be a minimum of 3 separate cells. Baffles may be used to create up to 2 cells in one lagoon.

(e) All aerated lagoon systems shall be designed with piping flexibility to allow isolation of any cell without affecting the transfer and discharge capabilities of the total system.

(f) The ability to discharge influent waste load to a minimum of 2 cells or all primary cells in the system shall be provided.

(g) The shape of all lagoons shall be such that there are no narrow or elongated portions. Lagoons shall be round, square, trapezoidal, or rectangular with the length not exceeding 3 times the width.

(h) Additional lagoon volume of at least 20 percent shall be included for sludge storage and ice cover.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 710.07 Aerated Lagoon Design: Aeration Equipment. In addition to the applicable portions of Env-Wq 710.02 and Env-Wq 710.03, aerated lagoon aeration equipment shall meet the following requirements:

(a) Aeration shall be of the diffused or mechanical mixing type; and

(b) For diffused air systems:

(1) Multiple blower units shall be provided and sized such that, with any unit out of service, the remaining units are capable of supplying all aeration needs;

(2) Means shall be provided for regulating, measuring, and recording the flow of air to the lagoons;

(3) Air diffusion piping headers and piping supports shall be corrosion-resistant with a durability for the anticipated life of the WWTP; and

(4) Ductile iron pipe headers or piping shall not be cement lined.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 710.08 Aerated Lagoon Design: Inlet and Outlet Piping.

(a) Aerated lagoon piping systems shall be designed to avoid areas of wastewater stagnation, short circuiting, solids deposition, or dead zones.

(b) Inlet piping shall be located 1/5 to 1/3 of the total water depth from the lagoon bottom, but not less than 2 feet above the bottom of the lagoon bottom. On lagoons 150 or more feet wide, multiple inlets shall be used to enhance distribution of the influent flow.

(c) Outlets shall be designed to provide multiple draw-off levels. Draw-off capability shall be provided over as much of the operating depth as feasible.

(d) All aerated cells shall have influent lines which distribute the load within the mixing zone of the aeration equipment to minimize short-circuiting.

(e) The influent line shall discharge vertically on to a concrete apron to prevent scouring and erosion.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 710.09 Aerated Lagoon Design: Distribution and Interconnection Piping.

(a) Self-cleaning velocities shall be present in aerated lagoon distribution piping.

(b) To prevent erosion due to discharge at the termination of distribution piping, the piping shall rest on a concrete apron 4 feet square, as a minimum.

(c) Interconnecting piping shall discharge vertically near to the lagoon bottom and at the dike, thereby reducing erosion effects.

(d) Piping shall be ductile iron, stainless steel, HDPE, or SDR 35 PVC.

(e) Distribution and interconnection piping clean-outs shall be provided.

(f) Seepage collars shall be provided around any pipes penetrating the dike. The collars shall extend a minimum of 2 feet radially from the pipe.

(g) Flow distribution structures shall be designed to effectively split hydraulic and organic loads equally to primary cells.

(h) All primary cells shall have individual influent lines that terminate approximately at the mid point of the cell width and at approximately 2/3 of the cell length away from the outlet structure to minimize short-circuiting.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 710.10 Aerated Lagoon Design: Overflow Structures.

(a) Intakes for aerated lagoon overflow structures shall be located a minimum of 10 feet from the toe of the dike and 2 feet from the top of the liner.

(b) Weirs or gates shall be of lightweight, corrosion-resistant material such as aluminum or fiberglass.

(c) Scum baffle mechanisms shall be provided.

(d) Provision shall be made for draining the lagoons.

(e) Location of draw off pipes shall minimize erosion effects.

(f) To prevent overtopping the dikes, emergency overflow between cells shall be provided.

(g) Hydraulic capacity for discharge structures and piping shall allow for a minimum of 250 percent of the design maximum day flow of the system.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 710.11 Aerated Lagoon Design: Embankments, Dikes & Bottom.

(a) Aerated lagoon dikes, embankments, and bottoms shall form a stable structure impervious to seepage of lagoon liquid.

(b) The minimum top width of a dike or embankment shall be 8 feet to permit access by maintenance vehicles.

(c) Aerated lagoon dikes and embankments shall have inner faces not steeper than a 3:1 slope nor shallower than a 4:1 slope, and outer faces not steeper than a 3:1 slope.

(d) Aerated lagoons shall be designed such that surface water shall not flow or drain into the lagoons.

(e) Aerated lagoon dikes shall be designed to provide a minimum of 3 feet of freeboard above normal lagoon water surface elevation.

(f) For aerated lagoon systems, the design water depth shall be 10 feet to 20 feet.

(g) Seeding and erosion control shall be as follows:

(1) Outside slopes shall be seeded with perennial type, low growing, spreading grasses that minimize erosion and can be mowed; and

(2) Inside slopes shall have rip rap or comparable material of suitable size and weight installed to at least one foot below normal lagoon operating level to protect the slopes from erosion and wave action.

(h) The lagoon bottom shall be smooth and level at all points. Finished elevations shall vary not more than 3 inches from the average elevation of the bottom.

(i) A minimum separation of 4 feet between the bottom of the pond and the maximum ground water elevation shall be provided unless an effective underdrain system is provided.

(j) A minimum separation of 2 feet between the liner bottom and any bedrock formation shall be provided.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 710.12 Aerated Lagoon Design: Groundwater Pollution and Soil Formation.

(a) Contamination of groundwater by transmission through the soil or overflows that can cause a health hazard in water supplies or cause ground or surface water quality violations shall be prohibited.

(b) Liquid loss through the lagoon dikes and bottom shall be prohibited.

(c) Impervious membrane liners shall be installed in all new lagoons.

(d) Lined lagoons shall obtain a leak detection permit as required by Env-Wm 1403.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 710.13 Aerated Lagoon Design: Area Control.

(a) Fencing shall surround the entire site with locking access gates for vehicles and equipment. Fencing shall not obstruct maintenance vehicle traffic on top of the dikes.

(b) An all weather access road shall be provided to the pond site to allow year-round maintenance of the facility.

(c) Warning signs advising against trespassing and showing the nature of the facility shall be posted along the fence as follows:

(1) At least one sign on each side of the site; and

(2) At least one sign for every 500 feet of the fence's perimeter.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

PART Env-Wq 711 FIXED FILM BIOLOGICAL TREATMENT

Env-Wq 711.01 Trickling Filters.

(a) Biological trickling filters shall only be used when the sewage is amenable to treatment by aerobic biologic processes.

(b) Trickling filters shall be preceded by effective settling tanks equipped with scum collecting devices or other suitable pretreatment facilities and followed by final settling tanks in accordance with Env-Wq 708.

(c) Trickling filters shall be designed either as low-rate or high-rate filters which incorporate recirculation. Reduction in 5-day BOD in primary settling tanks shall not exceed 35 percent for filter design criteria.

(d) Design submittal requirements shall be as specified in Env-Wq 706.

(e) Trickling filters treating domestic wastes shall be sized according to Table 711-1 below, subject to the note in (f), below:

TABLE 711-1 Trickling Filter Design Criteria

	Standard Rate	Intermediate Rate	High Rate	Super Rate	Roughing Filter
Hydraulic Loading Rate					
mgd/acre	1-4	4-10	10-40	15-90[a]	60-180 [a]
gpd/sq ft	25-90	90-230	230-900	350-2,000[a]	1,400-4,200[a]
Organic Loading Rate					
lb BOD/d/acre-ft	200-1,000	650-1,300	1,000-13,000	up to 13,000	4,500-22,000
lb BOD/d/1000 cu ft	5-25	15-30	25-300	up to 300	100-500
Media depth, ft	6-8	6-8	4-8	up to 40	4-20
Recirculation	sometimes	usually	always	usually	not normally
Sloughing	periodic	continuous	continuous	continuous	continuous
BOD removal, %	80-85	50-70	65-80	65-85	40-60

(f) In table 711-1, the letter “a” shall indicate that the range does not include recirculation.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 711.02 Rotating Biological Contactors (RBCs).

(a) Rotating biological contactors (RBCs) shall only be used when the sewage is amenable to treatment by aerobic biological processes.

(b) RBC units shall be housed or otherwise protected from winter conditions, freezing damage, and UV degradation.

(c) Covers shall be designed to provide adequate ventilation and enclosed structures shall be protected from corrosion due to high humidity. Enclosures shall allow for the removal of one shaft without interfering with the WWTP operation.

(d) Covers shall allow operator access to all parts of the RBCs for observation and maintenance.

(e) RBCs shall be preceded by effective pretreatment and sedimentation facilities including bar screens, grit removal, and primary settling tanks to remove screenings, scum, grit, and suspended solids.

(f) Multiple trains shall be furnished for flexible operation and stage bypassing.

(g) Flow control to RBC tanks shall be by splitter boxes and weirs.

(h) Buildings housing RBC processes shall have ventilation of at least 6 air changes per hour.

(i) Electrical system components, panels, light fixtures, motors, and control centers shall be watertight and corrosion resistant.

(j) Shafts and media shall be designed for an operational life of 20 years.

(k) RBC units shall be sized in accordance with the following:

(1) Organic loading to the first stage of the RBC system shall not exceed 6 to 8 pounds of BOD_5/1,000 square feet/day or 2.5 to 4 pounds of soluble BOD_5/1,000 cubic feet/day.

(2) Maximum bearing capacities for the shafts shall be specified based on the expected film thickness, the capacity to strip biofilm, and an adequate margin of safety. Load cells shall be provided for all shafts to monitor loadings.

(l) Media shall be constructed to allow portions to be removed for cleaning and replacement without requiring the entire shaft assembly to be removed from the tanks.

(m) Adequate flexibility in process operation shall be provided by including one or more of the following in the design:

(1) Variable rotational speeds in the first and second stages, including speed reversal to remove excess biofilm;

(2) Removable baffles between all stages in contoured basins to avoid dead spaces;

(3) Positive influent flow control to each unit or flow train, including positively-controlled alternate flow distribution systems such as step feed;

(4) Positive air flow metering and control to each shaft when supplemental air or motor driven units are used; or

(5) Recirculation of secondary effluent.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

PART Env-Wq 712 DISINFECTION

Env-Wq 712.01 Disinfection Requirement. All wastewater shall be disinfected prior to discharge when the discharge permit includes bacteria limitations.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 712.02 Methods. The following disinfectant methods shall be allowed for wastewater discharges:

(a) Sodium hypochlorite or calcium hypochlorite; or

(b) Ultraviolet irradiation.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 712.03 Hypochlorite Systems.

(a) Hypochlorite solution feed equipment shall incorporate effluent flow proportional control systems or effluent flow proportional combined with demand proportional control systems.

(b) Hypochlorite feeders shall be of the positive displacement type.

(c) Hypochlorite solution storage shall be of sufficient volume to provide for dosing at the anticipated maximum dose rate at design annual average flow for 15 days.

(d) Hypochlorite solution feed systems shall be capable of dosing at the anticipated maximum dose rate at maximum flows, with turndown capabilities to accommodate minimum flows.

(e) A redundant hypochlorite feed pump shall be provided.

(f) Rooms housing hypochlorite feed equipment and appurtenances shall be mechanically ventilated to provide at least 6 air changes per hour.

(g) Mechanical ventilation systems shall draw from floor level.

(h) Application of hypochlorite shall be as follows:

(1) Mixing of the disinfectant at the point of injection before the contact tank shall be provided using hydraulic or mechanical means; and

(2) A minimum contact period of 15 minutes at peak hourly flow or maximum rate of pumping shall be provided.

(i) Contact tank design shall be as follows:

(1) The contact tank shall have a minimum of 2 separate chambers;

(2) The contact tank shall be configured to reduce short-circuiting of flows;

(3) A minimum 40:1 length to width ratio of the contact passage shall be provided;

(4) A scum baffle and scum removal piping shall be provided at the effluent end of the tank;

(5) Provisions shall be made for draining and washing down the contact tank; and

(6) Drainage flow shall be returned to the treatment process.

(j) Facilities shall be provided for obtaining samples, either grab or continuous as stipulated by permit, of the disinfected effluent after contact.

(k) Equipment for residual chlorine testing and recording shall be provided, which is capable of measuring in the range from 10 parts per million to the lower limit established by permit.

(l) Alarm systems shall be provided for low hypochlorite storage tank level and failure of the hypochlorite feed system.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 712.04 Dechlorination Systems.

(a) Dechlorination to reduce free and combined chlorine residuals in WWTP effluent, if required by permit, shall be by use of sulfite salt solutions.

(b) Dechlorination systems shall:

(1) Be sized to chemically neutralize 5 parts per million total residual chlorine at all flows;

(2) Be of the positive displacement type;

(3) Include storage of sufficient volume to provide for dosing at the anticipated maximum dose rate at design annual average flow for 15 days;

(4) Include a redundant dechlorination feed pump;

(5) Provide thorough hydraulic or mechanical mixing at the point of sulfite injection;

(6) Provide a flow proportional feed forward control system;

(7) Provide a sampling point for compliance monitoring after dechlorination; and

(8) Provide an alarm system to actuate upon failure of the dechlorination feed system.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 712.05 Ultraviolet (UV) Irradiation Systems.

(a) An initial assessment of the capabilities of UV disinfection shall be made through transmittance testing to demonstrate the absence of interfering constituents.

(b) UV disinfection systems shall deliver UV radiation dosages demonstrated by pilot testing to be effective in maintaining compliance with the bacteriological limits of the discharge permit.

(c) The UV disinfection system shall consist of multiple banks of lamp modules capable of disinfecting peak hourly flows with one bank out of service.

(d) Provisions shall be made for easy removal and inspection of UV lamps for maintenance or replacement without draining the UV channel.

(e) Provisions shall be made for cleaning the lamp sleeves.

(f) Provisions shall be made for draining and cleaning the UV channel while maintaining adequate disinfection or storing forward flow.

(g) UV system controls shall enable UV disinfection system output to be varied in proportion to the effluent flow for facilities with a design average flow in excess of 100,000 gpd.

(h) Warning alarms and automatic shut down shall be provided. Lamp output through the contact area shall be monitored, and a low dosage warning signal shall be furnished.

(i) The UV system shall be connected to the WWTP's standby power source and shall be equipped with an uninterruptible power supply to power unit during transfers to and from the standby power source.

(j) The UV system shall not produce any dangerous levels of ozone.

(k) The UV system operating area shall be ventilated.

(l) The UV system shall be fully enclosed in a building for year-round operation.

(m) Provisions for measuring UV transmittance shall be provided.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

PART Env-Wq 713 SLUDGE HANDLING AND DISPOSAL

Env-Wq 713.01 Sludge Stabilization Methods.

(a) Liquid or solid phase sludge stabilization in accordance with this part shall be required prior to the beneficial use of sludge and scum.

(b) Acceptable solid phase sludge stabilization processes after dewatering shall be as follows:

(1) Composting;

(2) Heat drying;

(3) Pasteurization;

(4) Air-drying;

(5) Lime stabilization; and

(6) Other processes as regulated under Env-Ws 800.

(b) Acceptable liquid phase sludge stabilization processes shall be as follows:

(1) Anaerobic digestion, including mesophilic and thermophilic processes;

(2) Aerobic digestion;

(3) Liquid lime stabilization; and

(4) Other processes as regulated under Env-Ws 800.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 713.02 Sludge Stabilization Design Requirements.

(a) Sludge stabilization processes shall be designed to meet the requirements of Env-Ws 800 for pathogen and vector attraction reduction for Class A and Class B biosolids.

(b) Proprietary processes for which design criteria are primarily provided by equipment manufacturers to accommodate their equipment and design concepts shall be supported by a detailed basis of design which

cites existing successfully-operating facilities with similar solids types and similar capacities with similar design criteria.

(c) A complete summary of the proposed design criteria for solids handling processes shall be provided in the basis of design, including:

(1) Intended disposal methods;

(2) Projected design year loadings;

(3) Design criteria, including:

a. Projected design load;

b. Design loading rate;

c. Detention time;

d. Number of units and dimensions

e. Capacity of each unit and total capacity;

f. Temperature;

g. Air supply rate;

h. Mixing energy;

i. Intended schedule of operation for non-continuous operations; and

j. Conditioning system details;

(4) Projected performance; and

(5) Proposed odor control technology.

(d) Access for maintenance, repair, and inspection shall be provided for all stabilization process equipment and related tankage.

(e) Safety devices shall include:

(1) Automatic shutdown upon critical system component malfunction;

(2) Alarm systems for equipment failure; and

(3) Alarm systems for hazardous conditions.

(f) Redundancy of equipment and tankage or adequate storage shall be provided so that the solids stabilization process will continue to be operable in the event of a failure of any single system component.

(g) Odor control shall be provided for processes that generate odors so that the odors do not create a nuisance at the property boundary.

(h) The owners of all sludge stabilization processes shall submit with the basis of design a written contingency plan that describes how solids processing and sludge removal will continue in the event of stabilization process equipment failure.

(i) Facility personnel shall be trained to implement the contingency plan and a copy of the contingency plan shall be kept at the facility at all times.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 713.03 Sludge Storage Requirements.

(a) Sludge storage facilities shall be designed to control odors so that the odors do not create a nuisance at the property boundary.

(b) For facilities that transport sludge to another facility as the means of disposal, storage capacity shall be designed to accommodate at least one week of sludge production.

(c) Storage areas shall be designed to minimize tracking of dewatered cake on-site and eliminate runoff from the dewatered cake storage area to other portions of the site or off-site.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 713.04 Anaerobic Sludge Digestion.

(a) Multiple tanks piped to operate in series or parallel shall be provided for the anaerobic sludge digestion process.

(b) The proportion of depth to diameter shall allow for the formation of supernatant liquor and sludge storage.

(c) Digestion tanks shall incorporate the following features to facilitate emptying, cleaning, and maintenance:

(1) The tank bottom shall slope to drain toward the withdrawal pipe at a slope of not less than 3 inches per foot unless mechanical sludge collection is employed;

(2) At least 4 access portals and one gas dome with one opening shall be provided in the top of the tank;

(3) One of the tank access portals shall be large enough to permit the mechanical removal of grit and sand;

(4) Non-sparking tools, rubber-soled shoes, safety harness, gas detectors for flammable and toxic gases, and gas masks of the hose or oxygen helmet type shall be specified for use in the tanks; and

(5) Alarms shall be installed to warn of:

a. Any drop of the liquid level below minimum operating elevation; or

b. Low pressure in the space above the liquid level.

(d) Digestion tanks shall incorporate the following inlet and draw-off features:

(1) Multiple sludge inlets and draw-offs ports and, where used, multiple recirculation suction and discharge points, to facilitate flexible operation and effective mixing of the digester contents shall be provided unless adequate mechanical mixing facilities are provided within the digester;

(2) One inlet shall discharge above the liquid level and be located at approximately the center of the tank to assist in scum breakup;

(3) The inlet discharge shall be isolated from the gas draw-off point of the cover; and

(4) Raw sludge inlet discharge points shall be located so as to minimize short-circuiting;

(e) Digester tanks shall be designed to provide the following capacities:

(1) Tank capacity shall be computed from the volume and character of sludge to be digested; and

(2) For conventional digestion, the volatile solids loading shall not exceed 0.03 pounds per cubic foot per day.

(f) All portions of the gas system, including the space above the tank liquor, storage facilities and piping, shall be designed such that under normal operating conditions, including sludge withdrawal, the gas shall be maintained under positive pressure.

(g) All occupied enclosed areas where gas leakage might occur shall be mechanically ventilated in accordance with NFPA 820 (2003).

(h) All gas metering, compressor, control and appurtenant equipment shall be located in a separate room with only an outside entrance and equipped with a gas detection alarm system.

(i) Pressure and vacuum relief valves and flame traps together with automatic safety shut-off valves shall be provided.

(j) The gas piping system shall be:

(1) Protected from freezing;

(2) Sloped to drain to condensation traps at all low points;

(3) Equipped with either float-controlled or U-tube water seal type condensate traps; and

(4) Corrosion resistant.

(k) Gas burning boilers and engines shall be:

(1) Located in ventilated rooms at ground level;

(2) Separated from the digester pipe gallery; and

(3) Equipped with flame traps.

(l) Electrical systems and equipment shall comply with the NEC requirements for class I division 2 locations.

(m) No electrical equipment shall be located within 25 feet of the waste gas burners.

(n) Any enclosure adjacent to digestion tanks or containing gas piping or gas equipment shall be provided with gas detection alarms and mechanical ventilation as required by NFPA 820 (2003).

(o) A gas meter with by-pass shall be provided.

(p) Digestion tanks shall be insulated to minimize heat loss.

(q) Sludge shall be heated by circulating the sludge through external heaters and piping shall be designed to provide for the preheating of feed sludge before introduction to the digesters. Provisions shall be made in the layout of the piping and valving to facilitate cleaning of these lines.

(r) Where digestion gas is used for heating, an auxiliary fuel shall be provided.

(s) Facilities for mechanical mixing of the digester contents shall be provided where required for proper digestion by reason of loading rates or other features of the system.

(t) Tank discharge piping shall be:

(1) Not less than 6 inches in diameter;

(2) Arranged so that withdrawal can be made from 3 or more levels in the tank; and

(3) Equipped with an unvalved emergency overflow designed to prevent gas discharge that will convey digester overflow to the WWTP headworks, the aeration process, or to another liquid sludge storage facility and that has provisions for monitoring overflows and sounding an alarm if and when an overflow occurs.

(u) Provision shall be made for sampling at each supernatant draw-off level.

(v) High pressure backwash facilities shall be provided for the piping system.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 713.05 Aerobic Sludge Digestion.

(a) Aerobic sludge digestion shall be accomplished in a tank or tanks designed to provide effective air mixing, reduction of the organic matter, and sludge concentration under controlled conditions.

(b) Tank capacities shall be based on the quantity of sludge produced and sludge characteristics including concentration, aeration time, and sludge temperature.

(c) Volatile solids loading shall not exceed 300 pounds per 1,000 cubic feet of volume per day in the digestion units.

(d) A minimum of 15 days detention shall be provided for waste activated sludge.

(e) A minimum of 20 days detention shall be provided for primary sludge or any combination of waste activated sludge and primary sludge.

(f) Duplicate tanks shall be provided unless an alternative method of solids handling or storage has been provided for use when the single digestion tank is not in service.

(g) Multiple tanks shall be designed to operate either in series or in parallel.

(h) Aerobic sludge digestion systems shall be provided with sufficient aeration and effective mixing equipment to maintain a dissolved oxygen concentration of at least 1.0 mg/l.

(i) The minimum quantity of oxygen provided shall be:

(1) Based on 2.1 pounds of oxygen per pound of volatile solids destroyed for open tank systems; or

(2) Based on 1.5 pounds of oxygen per pound of volatile solids destroyed for thermophilic systems.

(j) A minimum mixing requirement of 30 cubic feet per minute per 1,000 cubic feet of tank volume shall be provided.

(k) Facilities shall be provided for effective scum and grease removal.

(l) Impact of supernatant on the wastewater treatment process shall be included in the basis of design.

(m) Foam spray water piping and nozzles or other mechanical foam control devices shall be provided.

(n) An unvalved emergency overflow shall be provided that will convey digester overflow to the WWTP headworks, the aeration process, or to another liquid sludge storage facility and that has an alarm for high level conditions.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 713.06 Gravity Sludge Thickening.

(a) If interruption of the thickening process would cause the solids handling process to be discontinued, duplicate gravity thickeners shall be provided to allow the thickening process to continue without disruption with one unit out of service.

(b) Mechanical sludge collection picket arms shall be provided.

(c) Gravity thickeners shall be covered.

(d) The drive mechanism shall have:

(1) Sufficient torque capacity to handle the maximum sludge concentration and blanket thickness anticipated; and

(2) A high torque alarm and overload device.

(e) An odor control system shall be provided. Elutriation water may be used for this purpose only in conjunction with additional odor control measures.

(f) Metallic components of gravity thickeners shall be corrosion resistant.

(g) Gravity thickeners shall be designed on the basis of the following:

(1) Primary sludge solids loading of 20 to 30 pounds/day/square foot; and

(2) Combined primary and waste activated sludge loading of 5 to 14 pounds/day/square foot.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 713.07 Mechanical Sludge Thickening.

(a) Gravity belt, rotary drum, dissolved air flotation, and centrifuges shall be acceptable for mechanical thickening of primary, secondary, and combined sludges.

(b) A means of chemically conditioning sludges prior to mechanical thickening that meets the requirements of Env-Wq 713.09 shall be provided.

(c) Mechanical thickeners shall be capable of processing the maximum weekly sludge production in 30 hours.

(d) Where duplicate units are not provided, a contingency plan shall be submitted with the basis of design and sludge storage facilities shall be provided that are adequate to store sludge for the period of time anticipated for repairs to be made if the dewatering device is taken out of service for repair.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 713.08 Sludge Pumps and Piping.

(a) Sludge pumping systems shall be designed with adequate capacity to cover the full range of anticipated solids concentrations and sludge production rates. Operating pressures and head losses shall be calculated to account for the higher friction factors associated with the type of sludge being pumped.

(b) Duplicate sludge delivery pumps shall be provided.

(c) Net positive suction head conditions appropriate to pumping equipment flow and sludge characteristic variations shall be provided.

(d) Unless sludge sampling facilities are otherwise provided, quick closing sampling valves shall be installed at the sludge pumps.

(e) Sludge withdrawal piping shall have a minimum diameter of 6 inches. Sludge pump discharge piping shall be at least 4 inches in diameter. Where withdrawal is by gravity, the available head on the discharge pipe shall be at least 4 feet greater than the calculated head loss. All sludge piping systems shall be designed to provide a velocity of at least 2 feet per second.

(f) Provision shall be made for draining and flushing discharge lines.

(g) Gravity piping shall be laid on uniform grade and alignment. Slope on gravity discharge piping shall be not less than 3 percent.

(h) Provision shall be made for draining and flushing sludge processing lines.

(i) Piping installed inside digestion tanks shall have the corrosion resistance and support stability appropriate for a highly corrosive environment.

(j) For sludge pumping systems, alarms shall be provided for:

(1) Pump failure;

(2) Loss of pressure; and

(3) High pressure.

(k) Sludge pumps shall be equipped with high pressure shutoff switches.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 713.09 Sludge Conditioning.

(a) Storage space shall be provided for concentrated conditioning agents sufficient to maintain an inventory capable of meeting the facility needs for maximum monthly use.

(b) Storage and handling facilities shall be compatible with the material to be stored and shall comply with Env-Wq 706.19.

(c) Equipment shall be provided to allow for proper and safe physical movement of the bulk material storage containers.

(d) Facilities shall be provided to allow the wetting, mixing, and dilution of concentrated or dry conditioning agents and for aging, storage, and mixing of dilute material in sufficient volume for at least one day of sludge conditioning.

(e) Positive displacement pumps with a variable feed rate shall be used to control the conditioning agent feed rate to the point of use.

(f) Duplicate pumping systems shall be provided.

(g) The conditioning agent pumping system shall be fitted with appropriate backpressure valves to assure delivery of the correct volume of conditioning agent without being influenced by the volume in the storage tank or the backpressure on the piping system.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 713.10 Mechanical Sludge Dewatering.

(a) Mechanical devices acceptable to dewater sludge shall include belt filter press, centrifuge, rotary press, recessed chamber press, and screw press.

(b) The proposed use of less common alternatives, such as geotubes and rolloff containers fitted with screens, shall require supporting documentation demonstrating successful use in facilities similar to the proposed installation under similar design criteria and conditions.

(c) If a dewatering method is proposed for which supporting documentation demonstrating successful use in similar facilities under similar design criteria and conditions is not available, pilot testing shall be used to establish design criteria. As a minimum, sludge samples shall be submitted to the manufacturer of the proposed dewatering device for bench scale testing to estimate acceptable feed rates, chemical conditioning needs, capture, and cake solids for design when sludge is available.

(d) For facilities in which sludge is not available or is likely to change considerably in nature, successful performance from multiple facilities handling similar sludges under similar conditions and design criteria shall be documented.

(e) Mechanical dewatering units shall be capable of handling the maximum weekly sludge production in 30 hours.

(f) Alarm systems shall be provided to notify the operator(s) of conditions that could result in process equipment failure or damage, threaten operator safety, or a sludge spill or overflow condition.

(g) Mechanically dewatered sludge conveyance systems shall be provided with emergency shutdown safety devices along their entire length to immediately shut down the conveyor and notify the operator(s) of an alarm condition.

(h) Chemical feed systems for sludge conditioning shall meet the requirements of Env-Wq 713.09.

(i) A hose station shall be provided to allow for cleanup and washdown of the dewatering area and equipment at the end of dewatering operations.

(j) Ventilation of the dewatering area shall be provided to minimize the buildup of odors and humidity.

(k) Where duplicate sludge dewatering units are not provided, a contingency plan shall be submitted with the basis of design, and sludge storage facilities shall be provided that are adequate to store sludge for the period of time anticipated for repairs to be made if the dewatering device is taken out of service for repair.

(l) Sludge storage shall precede all mechanical dewatering units and shall be provided by the use of holding tanks or thickeners or chemical blending tanks, as required for the total dewatering process operation.

(m) Dewatering sidestreams shall be returned to the treatment process as far upstream as practicable prior to the biological treatment unit.

(n) A means shall be provided for measuring the quantity of sludge processed.

(o) Dewatering process rooms shall be lighted, heated, and ventilated. Floors of process rooms shall be pitched 1/4 inch per foot to drain points and be slip proof.

(p) Sludge dewatering process equipment shall be housed in processing rooms isolated from other portions of the WWTP.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 713.11 Sludge Drying Beds.

(a) Sludge drying beds shall be sized based on 1.5 square feet per capita.

(b) Sludge drying beds shall include an impervious membrane under the underdrain system.

(c) The lower course of gravel around the underdrains shall be graded and a total of 12 inches in depth, extending 6 inches above the top of the underdrains. A 3-inch layer of gravel 1/8-inch to 1/4-inch in size shall be placed above the gravel bedding.

(d) The top layer of the bed shall consist of 9 to 12 inches of clean sand with an effective grain size of 0.3 to 0.6 mm or a comparably graded artificial media.

(e) Subnatant collected from the underdrains shall be returned to the treatment process prior to the biological treatment unit.

(f) Drying beds shall be covered.

(g) Bed underdrains shall be ductile iron, HDPE, PVC, or concrete pipe no less than 4 inches in diameter and spaced not more than 10 feet between centers.

(h) Paved surface beds shall be prohibited.

(i) Bed walls shall be watertight and extend 15 to 18 inches above the top layer or surrounding topography, whichever is higher, and 6 inches below the invert of the underdrain. Outer walls shall be curbed to prevent soil from washing on to the beds.

(j) Not fewer than 2 beds shall be provided.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 713.12 Additional Required Features of Sludge Handling Processes.

(a) All essential components of the solids handling processes shall be designed to provide duplicate units, redundancy, or backup capabilities so that malfunction of any one component will not result in interruption of the entire sludge handling process. Where duplicate units are not provided, a contingency plan shall be submitted with the basis of design.

(b) Piping systems for solids handling shall provide, for all reaches of the sludge piping:

(1) High pressure flushing capability; and

(2) Sufficient valving to allow for isolation of all unit processes.

(c) Clearance adequate to allow physical access by WWTP staff shall be provided in and around solids handling equipment to allow for:

(1) Inspection;

(2) Cleaning;

(3) Lubrication;

(4) Removal and repair of key components; and

(5) Routine maintenance.

(d) Completely enclosed process units shall be provided with inspection ports and 2 points of physical access through portals or hatches.

(e) Control systems appropriate to the specific solids handling process shall be provided to allow for manual and automatic operation of the systems.

(f) Instrumentation and control devices shall be provided to:

(1) Detect and convey alarm conditions such as high liquid storage levels, equipment misalignment or jamming, equipment failure, overheating, or overtorquing; and

(2) Shut down solids handling processes for conditions that could cause damage to the system or injury to the operator(s) or result in spills or overflows of liquids or solids from the handling process.

(g) An operation and maintenance (O&M) manual shall be provided for the solids handling process that describes procedures for:

(1) Normal operation;

(2) Adjustment and calibration;

(3) Troubleshooting;

(4) Maintenance and repair; and

(5) Controls for normal, bypass and emergency conditions.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

PART Env-Wq 714 INNOVATIVE AND ALTERNATIVE TECHNOLOGIES

Env-Wq 714.01 Purpose and Applicability.

(a) The purpose of this part is to provide the methodology and review process for the evaluation and approval of innovative/alternative (I/A) waste treatment systems in compliance with RSA 485-A:4, IX.

(b) This part shall apply to all wastewater treatment and conveyance technologies subject to review and approval under Env-Wq 701 through Env-Wq 713 and Env-Wq 715 and not expressly described therein.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 714.02 Operating Requirements.

(a) The owner shall operate and maintain I/A wastewater treatment and conveyance systems in accordance with all applicable laws and rules.

(b) The owner shall replace or modify an I/A system if the technology fails to meet the intended purpose or discharge permit limits or other requirements.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 714.03 Use of I/A Technology. No I/A wastewater treatment and conveyance technologies shall be used in a full scale application at a municipal facility until the technology has been evaluated and approved by the department. If a pilot test is used, the owner shall submit the pilot test data to the department for review and approval in accordance with Env-Wq 714.04 prior to designing or constructing a full-scale system.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 714.04 I/A Technology Evaluation Process.

(a) Anyone proposing an I/A technology that has not been previously approved by the department shall submit a request to the department for approval of the technology.

(b) The request submitted pursuant to (a), above, shall include:

(1) A narrative describing the proposed technology;

(2) A discussion of applications or demonstration projects using the technology; and

(3) The benefits expected from its use.

(c) If the proposed technology has not been fully proven but has been developed in documented research and demonstration projects, a technology assessment report shall be prepared and submitted to the department for review in accordance with Env-Wq 714.05.

(d) If the proposed technology has been proven in other applications, and there are a number of existing full scale applications and design criteria and operational data are available, then a basis of design shall be prepared and submitted in accordance with Env-Wq 714.06.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 714.05 Technology Assessment Report Submittal and Review.

(a) The technology assessment report specified in Env-Wq 714.04(c) shall include:

(1) A written description of the proposed I/A technology;

(2) A history of where and when the technology was developed;

(3) Operational reports, technical reports, and laboratory reports that resulted from research or demonstration projects;

(4) A full listing of all applications and tests of the technology;

(5) Records regarding the length of time the technology has been operated and evaluated and the climate conditions under which the testing was conducted;

(6) Documentation of flow rates, volumes, and pollutant loadings during demonstration projects and a discussion of how these loadings compare to full scale operation;

(7) A discussion of how the design criteria for the technology have been developed; and

(8) A discussion of the advantages of the proposed technology and risks associated with adoption of the technology.

(b) The department shall evaluate the technology assessment report to determine whether the proposed I/A technology meets the following criteria:

(1) Whether the proposed technology offers advantages over conventional technology in at least one of the following areas:

a. Reduction of life cycle costs;

b. More efficient use of energy or resources;

c. Elimination or reduction of discharge of pollutants; or

d. Recycling, reclamation or re-use of byproducts of the process.

(2) Whether the technology appears promising based upon the results of research and demonstration projects with benefits that outweigh the element of risk;

(3) Whether the expected treatment results satisfy the requirements of the discharge permit;

(4) If applicable, whether spare parts and servicing are available; and

(5) Whether the I/A system is no more difficult to operate than a conventional WWTP and provides at least the same level of protection to public health, the environment, and the I/A system's operators.

(c) The department shall respond to the technology assessment report in writing within 60 days based upon its review of the information submitted.

(d) If the department cannot determine whether the proposal meets the criteria listed in (b), above, the department shall identify the deficiencies and request the applicant to provide additional information to address them.

(e) If the department determines that the proposal meets the criteria listed in (b), above, and that conditions are not necessary to protect public health, the environment, or operators, the department shall approve the proposal.

(f) If the department determines that the proposal meets the criteria listed in (b), above, but conditions are necessary to protect public health, the environment, or operators, the department shall approve the proposal with such conditions as are necessary.

(g) If the department determines that the proposal does not meet the criteria listed in (b), above, or that no conditions could be added that would be adequate to protect public health, the environment, or operators, the department shall reject the proposal.

(h) If the department approves the proposal with conditions or rejects the proposal, the written decision shall specifically state the reason(s) for the decision.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 714.06 Basis of Design.

(a) Upon approval or conditional approval of the technology assessment report, or pursuant to Env-Wq 714.04(d), the owner shall submit a basis of design in accordance with Env-Wq 706.05 for the proposed project.

(b) The department shall respond to the basis of design within 60 days.

(c) The department shall accept the proposed basis of design if the proposed basis of design appears to provide treatment that will be adequate to satisfy the requirements of the discharge permit.

(d) Acceptance of the basis of design shall constitute authorization to proceed with final design for the proposed I/A technology project.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 714.07 Final Plans. After acceptance of a basis of design, the owner shall submit final plans and specifications for review and approval in accordance with Env-Wq 703.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 714.08 Performance Assessment.

(a) During the first year of operation of an I/A project, the owner shall submit 2 reports of performance to the department, the first after 6 months of operation and the second after 12 months of operation.

(b) The owner may request that the performance assessment report schedule be extended in accordance with Env-Wq 714.09.

(c) The performance assessment report shall include:

(1) Sampling and analysis results for influent and effluent parameters;

(2) Calculated loading rates during the performance period;

(3) An assessment of benefits identified in the I/A technology assessment report;

(4) A discussion of system performance process parameters determined to be critical to proper operation and adjustments made during performance period; and

(5) An assessment of the system's ability to meet effluent criteria.

(d) The department shall review the performance assessment report and approve the system for continued use if the department determines that:

(1) The system is capable of consistently meeting the limits of the discharge permit at proposed loadings based upon performance during the assessment period; and

(2) No permit violations resulting from the I/A technology occurred during the performance assessment period for at least 3 consecutive months.

(e) If the department cannot accept the system, the owner may prepare an action plan to obtain satisfactory performance and submit the plan to the department. The action plan shall clearly identify the cause(s) of unsatisfactory performance and propose corrective measures.

(f) The department shall accept the action plan if the proposed corrective measures appear adequate to remedy the cause(s) of the unsatisfactory performance. If the action plan is accepted by the department, the system shall undergo one additional year of temporary operation and the owner shall submit 2 additional performance reports to the department at 6-month intervals.

(g) If the action plan is not acceptable or if the owner chooses to not submit an action plan, the owner shall remove the I/A system or replace the system with a conventional system.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 714.09 Extension of Performance Assessment Period.

(a) If the owner of an I/A system determines that the performance assessment cannot be completed in one year, the owner shall submit a written request for extension to the department.

(b) The request for extension shall contain the following information:

(1) Facility name and location;

(2) Date of I/A technology approval;

(3) Type of I/A technology system;

(4) Reason(s) why the performance assessment cannot be completed in one year;

(5) Steps that will be taken to complete the performance assessment; and

(6) Estimated amount of additional time required to fully assess the system.

(c) The request shall be filed not less than one month prior to the end of the one-year assessment period.

(d) The department shall respond to the request in writing within 30 days of receipt of a request filed in accordance with (b) and (c), above.

(e) The department shall grant the extension if the department finds that:

(1) The performance assessment cannot reasonably be completed in one year; and

(2) The steps identified by the owner appear adequate to fully assess the I/A technology system.

(f) If the department does not approve the request for extension, the response provided pursuant to (d), above, shall specify:

(1) The reason(s) for the decision; and

(2) The deadline for submittal of the second performance assessment report.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

PART Env-Wq 715 OWNERSHIP OF WWTPs

Env-Wq 715.01 Purpose. The purpose of this part is to establish conditions for issuance of discharge permits to privately-owned, non-industrial WWTPs under the authority of RSA 485-A:13.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 715.02 Subsurface Disposal Options. No discharge permits for privately-owned, non-industrial WWTPs discharging to surface waters or groundwaters shall be issued unless all subsurface disposal options as regulated by RSA 485-A:29-44 and Env-Ws 1000 have been considered and rejected by the department based on the criteria and procedures specified therein.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 715.03 Ownership Requirements. No discharge permits for WWTPs discharging to surface waters or groundwaters shall be issued unless the WWTP is:

(a) Municipally owned and operated;

(b) Municipally owned with a private contract for operations and maintenance;

(c) Privately-owned where connection to a municipal system is not possible, provided that:

(1) The municipality in which the WWTP is proposed agrees by affirmative vote of the local legislative body to be the holder or co-holder of any discharge permits issued; and

(2) The documentation requirements of Env-Wq 715.05 are met; or

(d) Privately-owned where:

(1) Municipal ownership is not possible, connection to municipal system is not possible, and the municipality in which the facility is located refuses to hold or co-hold the discharge permit, as shown by a negative vote of the local legislative body; and

(2) The documentation requirements of Env-Wq 715.05 are met.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 715.04 Capacity.

(a) Private ownership as allowed under Env-Wq 715.03(c) and (d) shall be limited to WWTPs with design flow capacities of 50,000 gpd or greater.

(b) WWTPs constructed to replace or rehabilitate an existing failed subsurface disposal system shall not be subject to the size restriction of (a) above, but shall otherwise meet the requirements of Env-Wq 715.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 715.05 Technical Documentation Requirements. An applicant for a discharge permit for a privately-owned WWTP as specified in Env-Wq 715.03(c) or (d) shall submit to the department:

(a) The following technical documentation with the application:

(1) Engineering and water quality studies as required to demonstrate that the proposed facility is consistent with statewide, areawide, or regional water quality planning pursuant to sections 205(j)(1), 205(j)(5) or 208 of the federal Water Pollution Control Act of 1972, as amended;

(2) Engineering and water quality studies to demonstrate that the discharge is consistent with the water quality goals as provided in RSA 485-A:8 and Env-Ws 1700 relative to water quality standards;

(3) Evidence in the form of certification from the municipality that the system proposed has the concurrence of the local governing body and local land use boards as defined in RSA 672;

(4) Technical design drawings and specifications in accordance with this chapter;

(5) Certification by a New Hampshire-licensed professional engineer that the facilities have been built in accordance with the approved plans and specifications, which certification shall be submitted within 60 days following completion of construction of the WWTP; and

(6) Evidence in the form of a written agreement that the WWTP will be operated by a certified operator as defined in Env-Ws 901; and

(b) Within 60 days following completion of construction of the WWTP or pump station(s), operation and maintenance manuals to provide information and guidance for day-to-day operation of the WWTP and pump stations, as applicable, that contain the following information:

(1) Information on process design assumptions;

(2) Unit process information that includes control measures and monitoring procedures for the various processes;

(3) Start-up procedures for each unit operation and piece of equipment;

(4) Maintenance management systems;

(5) Laboratory test procedures;

(6) Safety procedures;

(7) Organizational structure and administrative procedures;

(8) Troubleshooting procedures;

(9) Emergency operation plan;

(10) Staffing requirements;

(11) Process and Instrumentation diagram; and

(12) Checklists for systems and components for operator's use in developing a maintenance program for pump stations and WWTPs.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 715.06 Financial Documentation Requirements. An applicant for a discharge permit for a privately-owned WWTP as specified in Env-Wq 715.03(c) or (d) shall submit the following financial documentation:

(a) A system for assessing the users of the WWTP, which system shall:

(1) Assess users on a pro rata basis;

(2) Generate sufficient funds to be used to cover all expenses and charges related to the operation, maintenance, routine repair and replacement, and financing of the WWTP;

(3) Include provisions for calculating the assessments based on the total costs enumerated in (2) above;

(4) Include provisions for notifying users of the amounts due, collecting the amounts due on a periodic basis, and rebating excess collections or applying excess collections to the next billing period; and

(5) At the owner's discretion, include provisions for terminating service or assessing and collecting penalties for non-payment;

(b) Evidence of a capital reserve account, which account shall:

(1) Be sufficient to cover the cost of replacement of the WWTP within 20 years;

(2) Serve as a source of funds for emergency cleanup and containment and major repairs or replacement of system components;

(3) Be established prior to initiation of operation of the WWTP;

(4) Identify the situations in which the account may be accessed;

(5) Restrict account payments for repair and replacement costs to those in excess of $2,000;

(6) Be sheltered from liability or bankruptcy claims, attachments**,** or other such liens;

(7) Provide for management of the account and bonding of the account managers;

(8) Authorize access to the account by the department for use in remedying an emergency situation in cases where the managers of the account refuse to remedy the emergency situation; and

(9) Provide for funding the account; and

(c) Ownership documentation, comprising:

(1) Documents that evidence the owner's legal authority to construct and provide continuous operations and maintenance of the facilities which include one of the following:

a. The articles of incorporation for a private corporation;

b. The partnership agreement for a partnership; or

c. The condominium instruments for a condominium association;

(2) For issuance of a permit pursuant to Env-Wq 715.03(c), a formal written and executed agreement between the owner and the municipality that the municipality has agreed to be the holder or co-holder of the discharge permit; and

(3) For issuance of a permit pursuant to Env-Wq 715.03(d), a docket number from the New Hampshire public utilities commission showing that the facility owner is or will be a company subject to, and in full compliance with, the rules of the New Hampshire public utilities commission.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

PART Env-Wq 716 WAIVERS

Env-Wq 716.01 Purpose. Because the rules contained in Env-Wq 700 apply to a variety of conditions and circumstances, strict compliance with all rules might not fit every situation. The purpose of the rules in this part is to establish the procedures and criteria under which the owner of proposed sewerage or WWTP, or the owner's authorized representative, may seek waiver relief from specific rules contained in Env-Wq 700.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 716.02 Waiver Requests. All requests for waivers shall be submitted to the department in writing and provide the following:

(a) A reference to the specific rule for which a waiver is requested;

(b) An explanation of why the waiver is necessary;

(c) If an alternative method, procedure, or design is proposed in lieu of the requirement for which the waiver is requested, supporting data and calculations to show the efficacy of the alternative in protecting public health, the environment, and WWTP operators; and

(d) If the request is not filed by the governing body of the municipality, written concurrence from such governing body.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Env-Wq 716.03 Decisions on Waiver Requests. The department shall grant waiver relief if it determines that the requirement that is the subject of the request is not mandated by state or federal statute or federal regulations and:

(a) Strict compliance with the requirement is not necessary to protect public health, the environment, or WWTP operators; or

(b) The proposed alternative is at least as protective of public health, the environment, and WWTP operators as the specific requirements contained in the rule.

Source. (See Revision Note at chapter heading for Env-Wq 700) #8590, eff 3-25-06

Appendix

Rule Section(s)	**State Statute(s) Implemented**
Env-Wq 701	RSA 485-A:4, VI; RSA 485-A:4, IX
Env-Wq 702	RSA 485-A:4, VI; RSA 485-A:4, IX
Env-Wq 703	RSA 485-A:4, VI; RSA 485-A:4, IX
Env-Wq 704	RSA 485-A:4, IX
Env-Wq 705	RSA 485-A:4, IX
Env-Wq 706	RSA 485-A:4, IX
Env-Wq 707	RSA 485-A:4, IX
Env-Wq 708	RSA 485-A:4, IX
Env-Wq 709	RSA 485-A:4, IX
Env-Wq 710	RSA 485-A:4, IX
Env-Wq 711	RSA 485-A:4, IX
Env-Wq 712	RSA 485-A:4, IX
Env-Wq 713	RSA 485-A:4, IX
Env-Wq 714	RSA 485-A:4, IX
Env-Wq 715	RSA 485-A:13, I(a)
Env-Wq 716	RSA 541-A:22, IV